



# Walking Conditions Technical Memorandum

April 27, 2023



CITY OF  
**ORLANDO**

**SOUTHWEST BIKE AND PEDESTRIAN STUDY**

# Walking Conditions Technical Memorandum

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## 1.0 Introduction

The purpose of the Southwest Orlando Bike and Pedestrian Study is to identify and develop recommendations and concepts to improve conditions and the environment for people currently or desiring to walk or ride a bike safely and connect to key destinations in southwest Orlando within the city limits but generally bounded by SR 408, John Young Parkway, Sand Lake Road and Hiwassee Road (see Figure 1). This study will build on recent planning efforts such as the Orlando Bike Plan and Vision Zero Action Plan, as well as the recently completed pedestrian and bicycle infrastructure projects. The study area has a strong economic base containing Universal Studios and the International Drive Tourist District, which rely heavily on service and entertainment workers. The area also contains Valencia College West Campus and industrial parks that use different aspects of the city's transportation network. The transportation network within the study area is served by large arterial roadways with limited transit service and an insufficient amount of bicycle and pedestrian infrastructure.

This study will address the challenges identified for bicyclists and pedestrians to establish a more comfortable environment for all modes along heavily traveled streets, as well as providing enhanced street crossing opportunities. The overall study will combine five separate, but interrelated tasks to analyze and recommend improvements that will connect people in this area of the city to jobs, schools, and entertainment uses. The five tasks are related to the following:

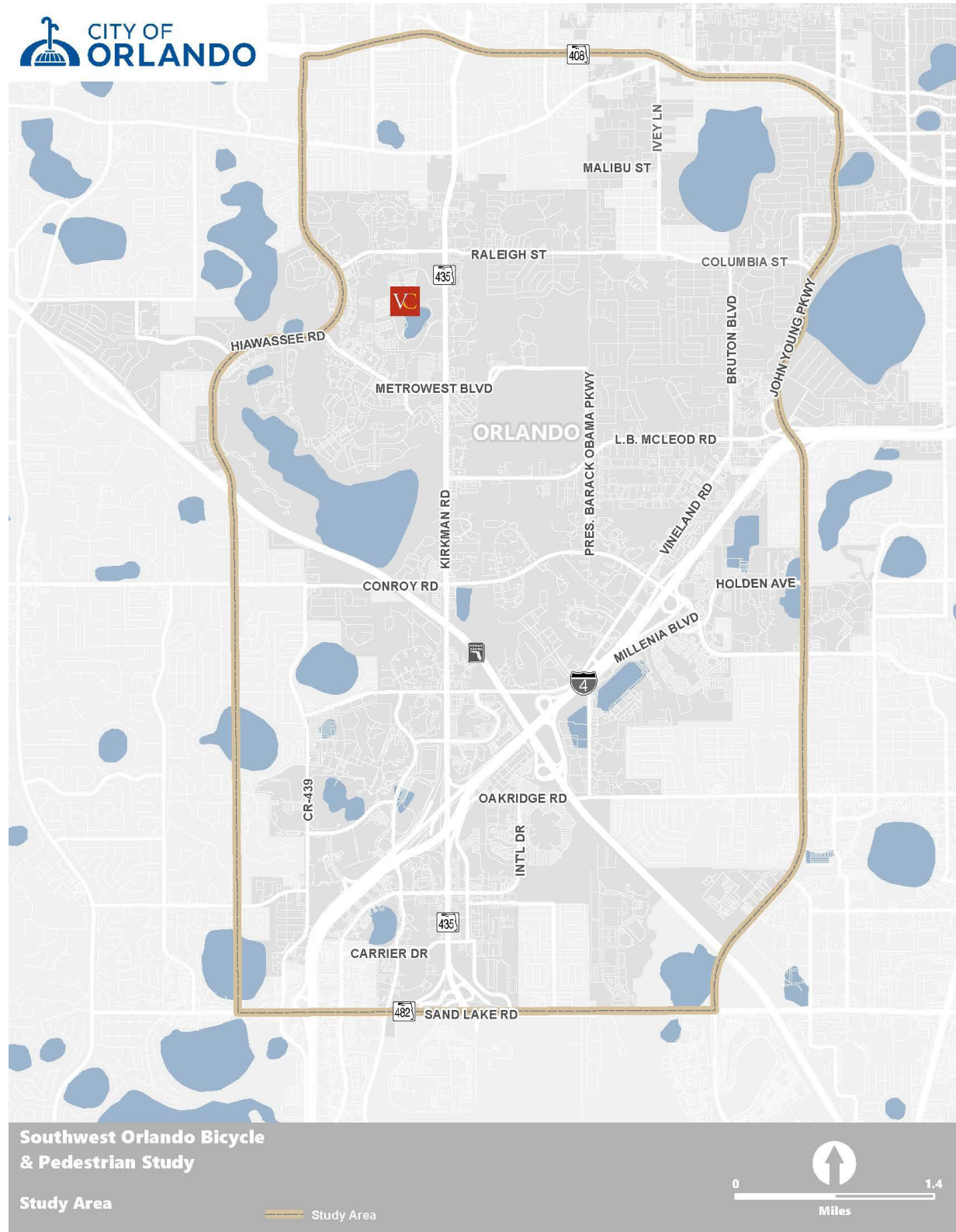
1. Arterial roadway crash analysis / Safety analysis
2. Valencia College West Campus bicycle and pedestrian study
3. Pedestrian and bicycle overpass locations feasibility analysis
4. Off-street trail concepts and connectivity study
5. Pedestrian walking conditions analysis / recommendations

This technical memorandum summarizes the analysis of walking conditions in the study area based on the following criteria: pedestrian safety and access to transit, Pedestrian Level of Service (PLOS), and sidewalk gaps. It then proposes cost-effective improvements that address safety, connectivity, and comfort and scores them for prioritization. The top infrastructure improvements are recommended for near-term implementation. These improvements will enhance the pedestrian experience in the southwest Orlando area.



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Figure 1 | Southwest Bike and Pedestrian Study Area



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## 2.0 Pedestrian Safety and Access to Transit Assessment

### 2.1 Vision Zero and Safety Audits

The City of Orlando adopted a resolution in December 2017 with a goal to eliminate traffic fatalities and serious injuries by the year 2040. The Vision Zero Action Plan published in 2021 provides a structure and necessary strategies for city government, residents, visitors, and businesses to work together to reach this goal. The plan follows the fundamental premises that:

- Everyone has the right to move safely in their communities
- System designers and policy makers share responsibility to ensure safe systems of travel
- Traffic deaths are preventable
- A data-based approach will promote equitable, safe transportation

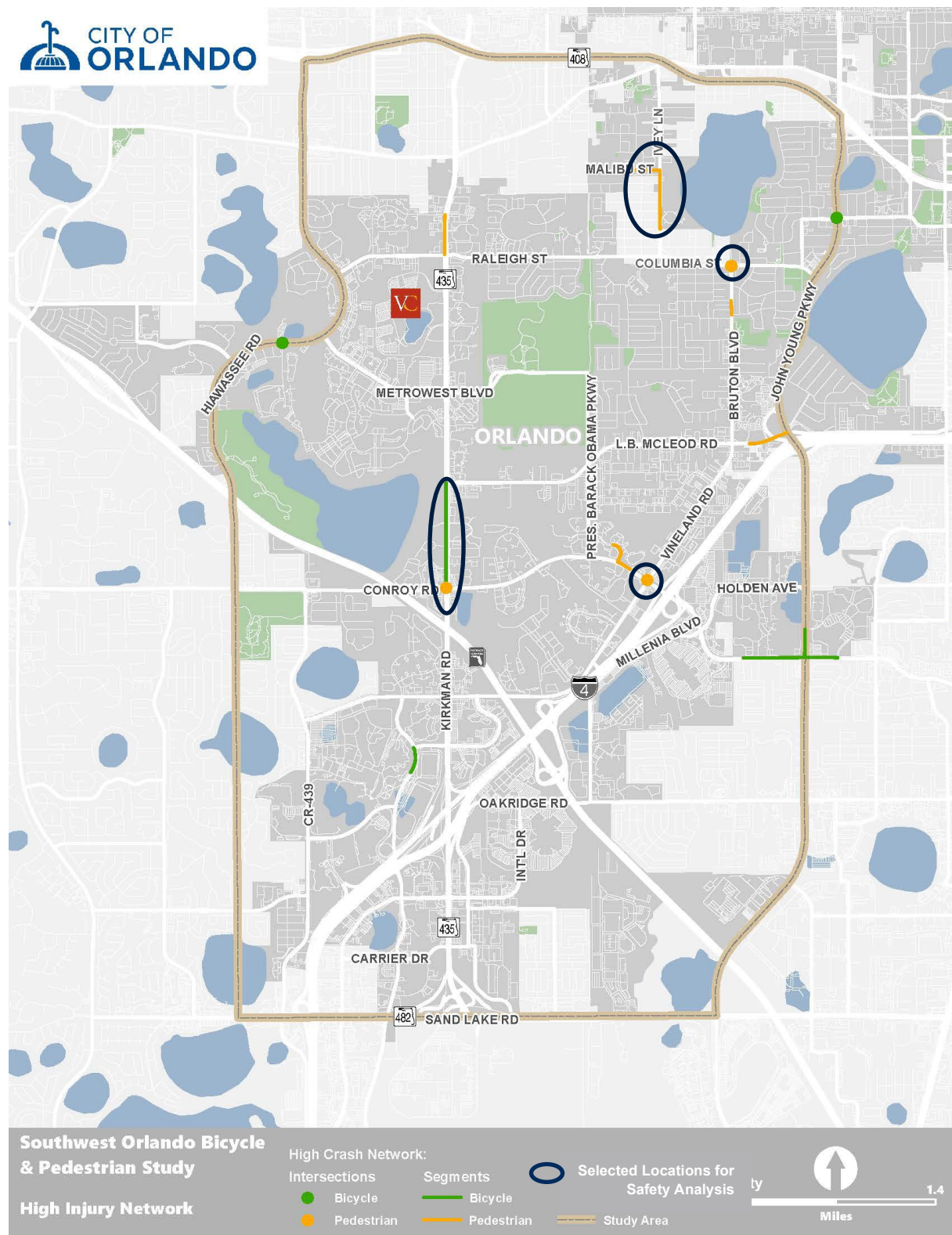
The plan also identifies a High Injury Network (HIN) with corridors and intersections where serious or fatal crashes occur most often.

A map of the HIN specifically related to bicycle and pedestrian crashes is presented in Figure 2. Areas circled in blue were identified for a safety audit as part of the Southwest Bike and Pedestrian Study - two (2) high priority intersections and two (2) high priority roadway segments from the HIN were selected to complete a detailed safety assessment.



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Figure 2 | High Injury Network



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## 2.2 Priority Area Identification

Fully connected and comfortably designed pedestrian networks are an indispensable precursor to highly use transit systems. Since a wide range of potential riders will walk farther on comfortable, active, pedestrian-friendly streets, transit reaches its greatest potential in walkable urban places. Locations for the transit access assessment were selected based on the following criteria:

- Transit Ridership
- Pedestrian/Bicycle Crashes
- Proximity to Communities of Concern
- High Injury Network

Transit stop areas with high ridership activity were prioritized for the walking conditions assessment. LYNX stop-level data from its 2020 fiscal year was used to identify high ridership locations, as shown in Figure 3. Locations with high transit activity were further prioritized based on the incidence of pedestrian and bicycle crashes (Figure 4), locations in proximity of communities of concern (Figure 5), and locations within the HIN (Figure 2). Stop areas that coincide with the locations selected for safety audits were not considered because recommendations for these locations were evaluated in a separate Task of this study.

Table 1 | Stop Locations Prioritization

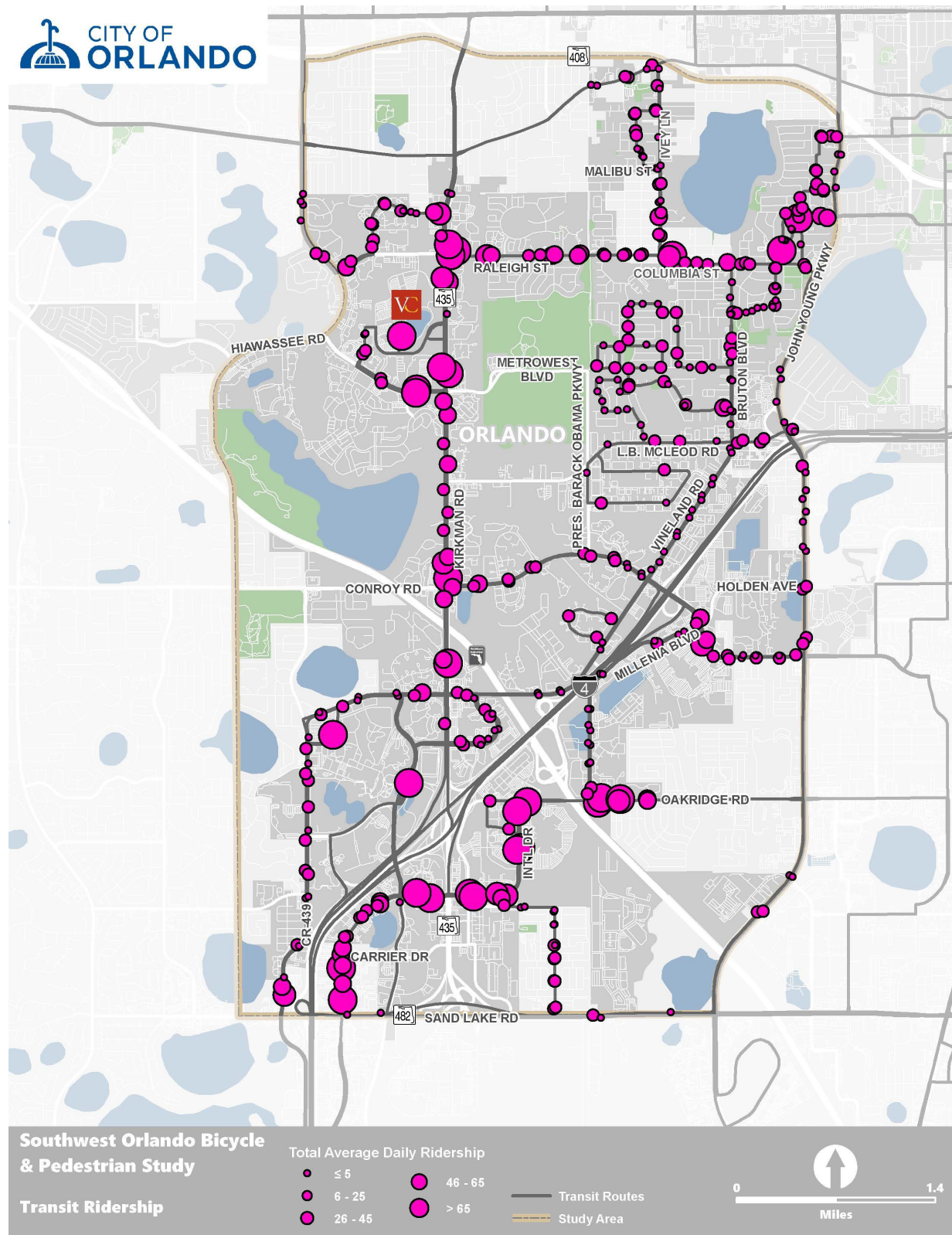
Location	Transit Ridership	Ped/Bike Crashes	Communities of Concern	HIN	Safety Audits?
Conroy Rd at Kirkman Rd	High	High	Medium	Yes	Yes
Columbia St at Bruton Blvd	High	High	High	Yes	Yes
Ivey Lane	Medium-High	High	High	Yes	Yes
Raleigh St at Kirkman Rd	High	High	Medium-High	No	No
Conroy Rd at Millenia Blvd	High	High	Medium-Low	No	No
Oak Ridge Rd at Millenia Blvd	High	Medium-High	High	No	No
Universal Studios Superstop	High	Low	Medium-Low	No	No
Metrowest Blvd at Kirkman Rd	High	Medium-High	Medium	No	No
International Dr at Kirkman Rd	High	Medium-High	Medium-High	No	No





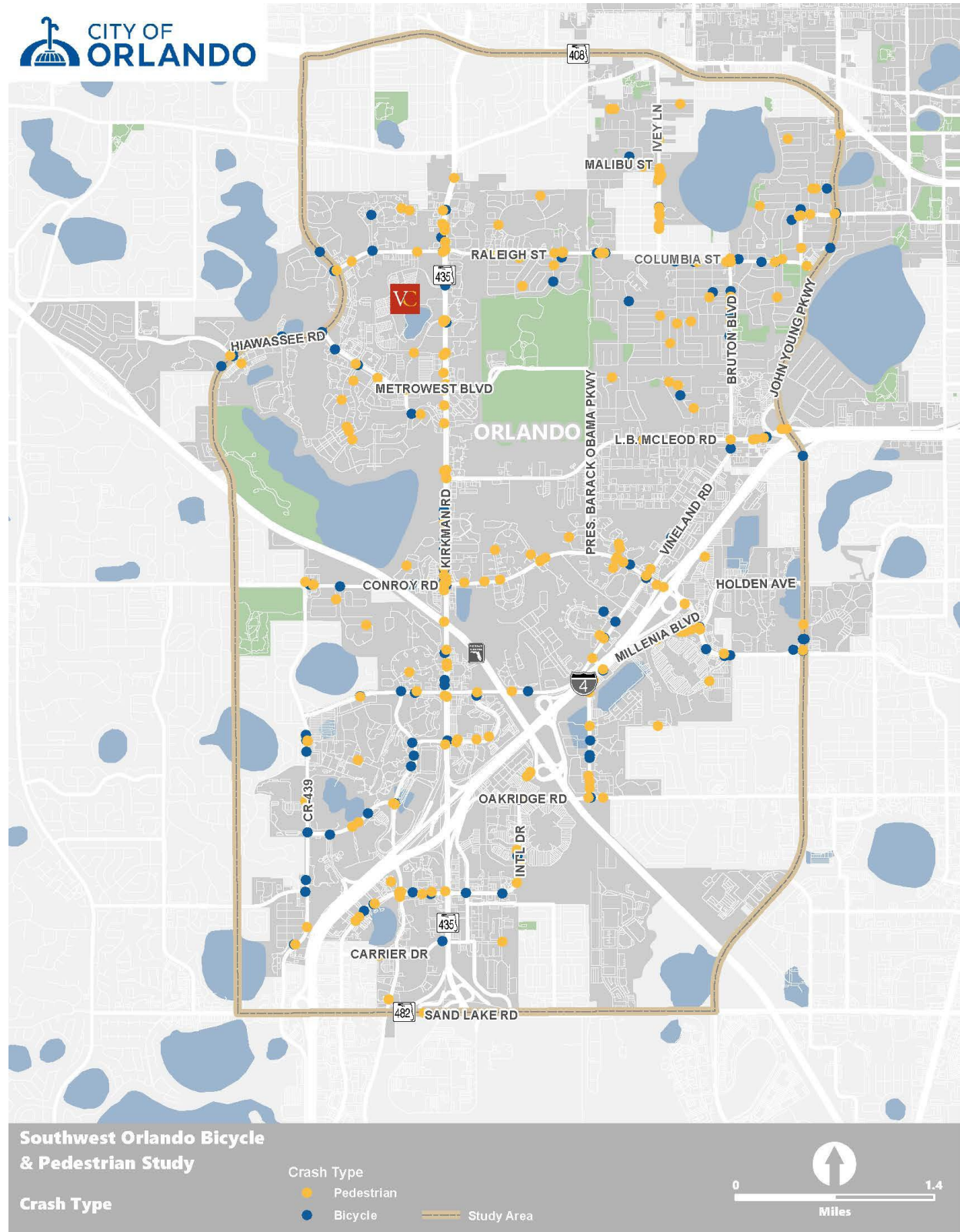
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Figure 3 | LYNX Bus Ridership (FY 2020)



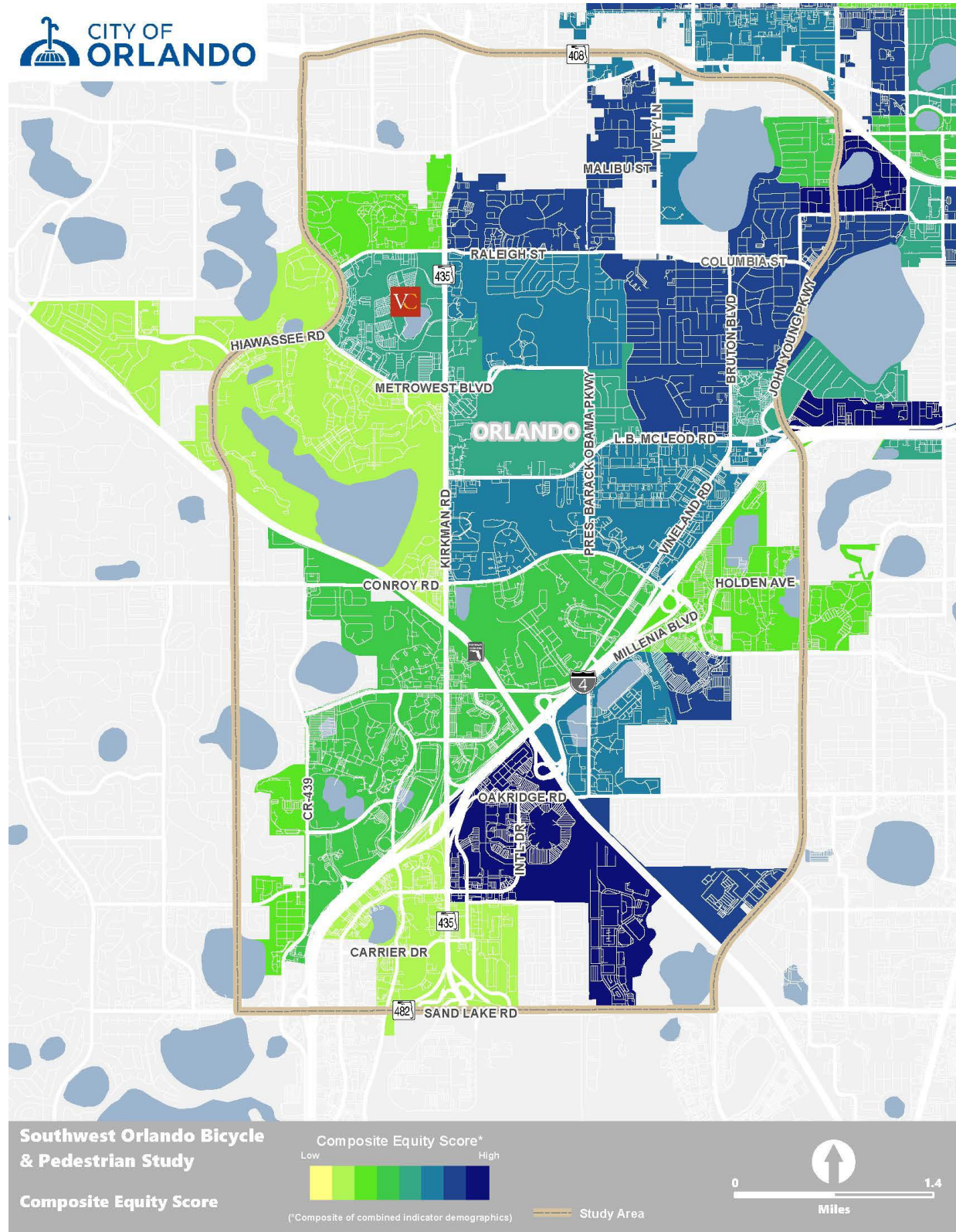
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Figure 4 | Pedestrian/Bicycle Crashes



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Figure 5 | Communities of Concern



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Table 2 lists the locations for the transit access assessment that were selected in collaboration with the City of Orlando.

Table 2 | Transit Stop Area Prioritization Results

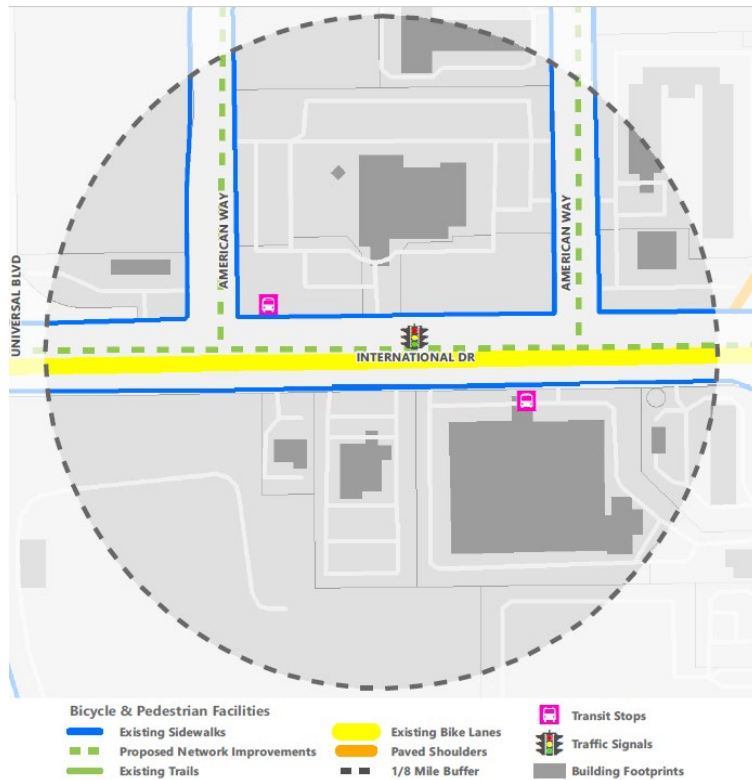
Rank	Transit Stop Location	LYNX Annual Ridership*
1	International Dr at Kirkman Rd <sup>1</sup>	239,921
2	Raleigh St at Kirkman Rd	82,358
3	Metrowest Blvd at Kirkman Rd	51,626
4	Conroy Rd at Millenia Blvd	44,318
5	Oak Ridge Rd at Millenia Blvd	84,848

\*Total annual ridership for LYNX stops within the analysis area

## 2.2.1 International Drive at Kirkman Road Stop Area

The International Drive (I-Drive) at Kirkman Road stop area features land use that is exclusively commercial. Within this area, the existing sidewalk network provides walking connections along main roadways, and there are one-way bike lanes along both sides of I-Drive with a signalized pedestrian crossing midblock. There is one vacant parcel zoned for commercial use that could increase the amount of vehicular travel and mass transit needs in the area when developed. Proposed improvements in the City of Orlando Bike Plan will provide connections along side streets, improving access to transit for bicyclists.

Figure 6 | International Drive at Kirkman Road Transit Stop Area



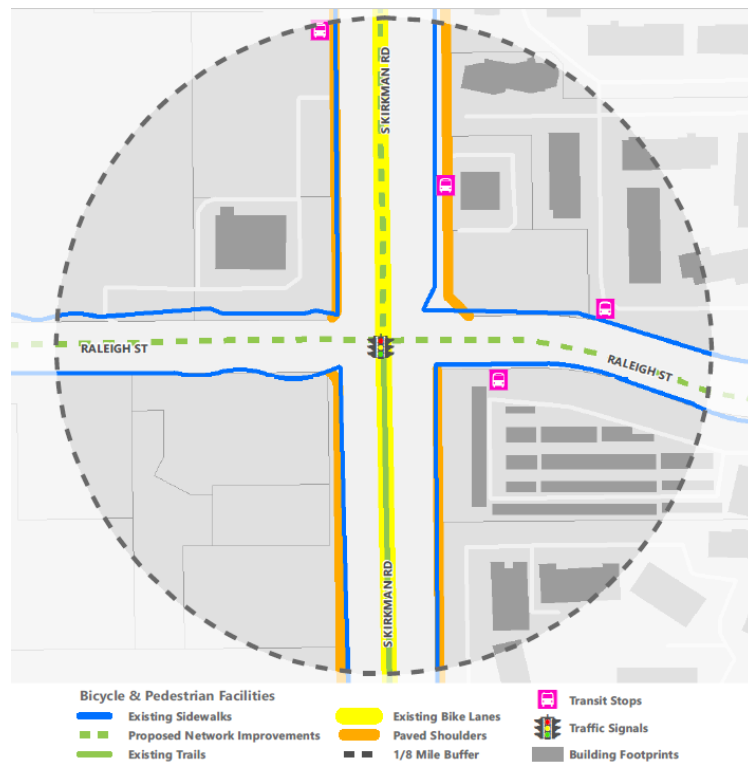
<sup>1</sup> Area of focus is where International Drive meets the side street American Way, just west of the Kirkman Rd intersection.

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## 2.2.2 Raleigh Street at Kirkman Road Stop Area

The intersection of Raleigh Street and Kirkman Road features a mix of land uses including, residential developments to the east, mostly commercial to the west, and a portion of industrial on the southeast side. Along Kirkman Road there is a newly installed 10-foot-wide multi-use trail that begins south of the intersection and continues south to LB McLeod Road. A five-foot-wide sidewalk is present on the western side, and there are buffered bike lanes on each side of the roadway. There are four vacant commercial parcels in this area that could increase the amount of vehicular travel and mass transit needs in the area when developed.

Figure 7 | Raleigh Street at Kirkman Road Transit Stop Area



## 2.2.3 Metrowest Boulevard at Kirkman Road Stop Area

The Metrowest Boulevard at Kirkman Road stop area features a mix of predominantly commercial and residential land uses. This portion of Kirkman Road has a 10-foot-wide multi-use trail on the eastern side, a five-foot-wide sidewalk on the western side, and buffered bike lanes on both sides of the roadway. There is a grass median in the roadway that ranges from 22 to 28 feet wide. In this area there is a small linear parcel of vacant land that is zoned commercial.

## 2.2.4 Conroy Road at Millenia Boulevard Stop Area

The intersection of Conroy Road and Millenia Boulevard features land use that is largely commercial with some recreational/public zoning in the far eastern portion of the study area. There are one-way bike lanes on the length of Millenia Boulevard and on the portion of Conroy south of the intersection. There are currently no vacant parcels in this area that could be developed.



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Figure 8 | Metrowest Boulevard at Kirkman Road Transit Stop Area

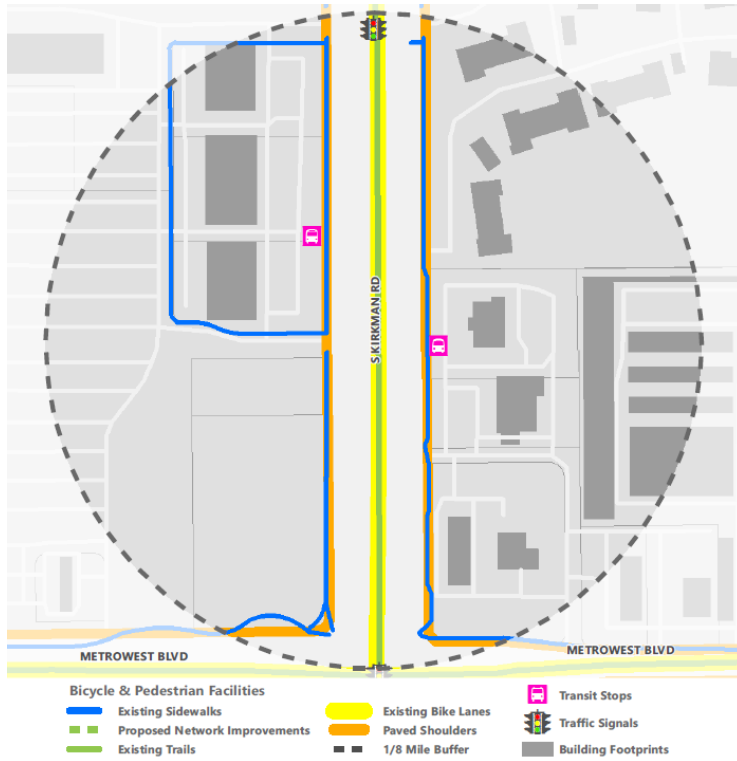
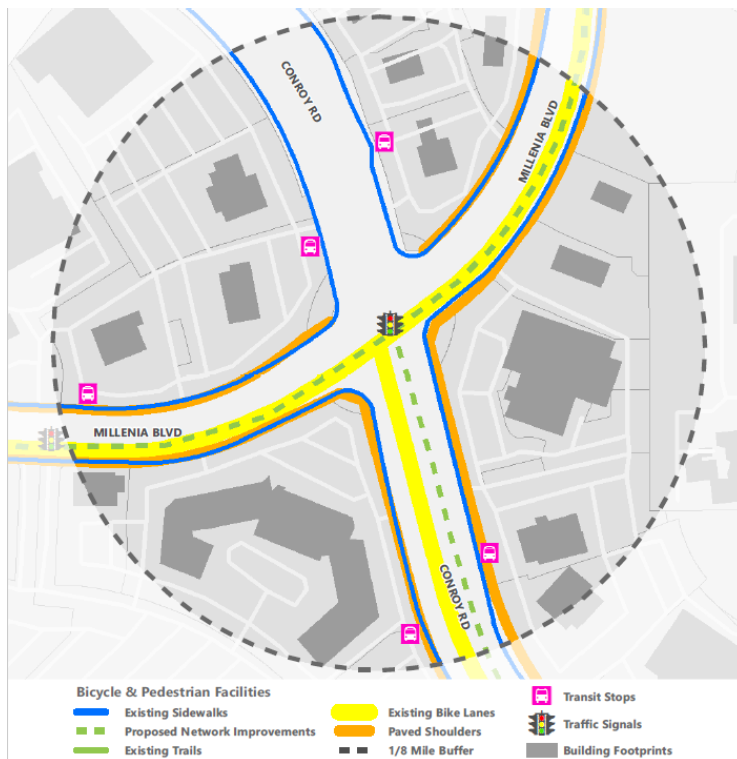


Figure 9 | Conroy Road at Millenia Boulevard Transit Stop Area

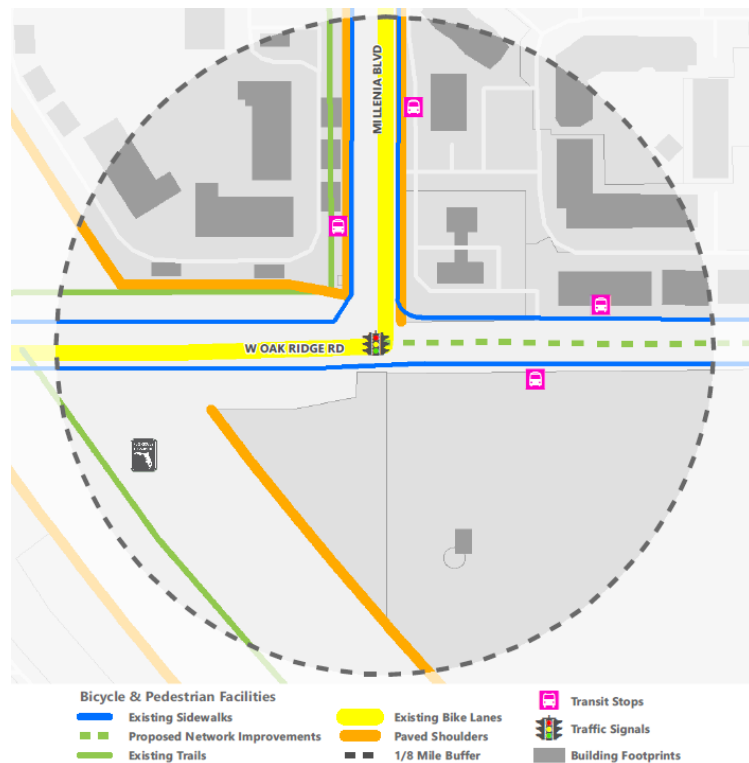


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## 2.2.5 Oak Ridge Road at Millenia Boulevard Stop Area

This stop area features mainly residential land use to the north and recreational/public land use to the south. There is a 10-foot-wide multi-use trail on the western side of Millenia Boulevard and five-foot-wide sidewalks line the eastern side of Millenia Boulevard and both the north and south sides of Oak Ridge Road. There are one-way bike lanes on both sides of Millenia Boulevard and a north/south pedestrian crossing on Oak Ridge Road at the easternmost stop in the study area. There is one triangular parcel of vacant land that is zoned commercial that may impact travel trends in the future if developed.

Figure 10 | Oak Ridge Road at Millenia Boulevard Transit Stop Area



## 2.3 Transit Access Assessment

Transit relies on pedestrian networks that are safe and comfortable, allowing people to walk to their destinations. Within and around a transit stop area (1/8 mile), an assessment to identify safety issues regarding pedestrian access to transit was completed. The concerns identified for each stop location are listed in Table 3 and depicted in Figures 11 through 15. Further detail can be found in Appendix A.



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Table 3 | Pedestrian Access to Transit Issues

Stop Location	Issues Identified
International Dr at Kirkman Rd	<ul style="list-style-type: none"> <li>• Long midblock crossing signal cycle lengths</li> <li>• Midblock crossing has limited visibility and speed reduction effects</li> </ul>
Raleigh St at Kirkman Rd	<ul style="list-style-type: none"> <li>• Limited tree coverage for pedestrian shading</li> <li>• Shared-use path along Kirkman Rd does not go beyond Raleigh St.</li> <li>• At the northbound far side stop, along Kirkman Road, the sidewalk is not directly connected to the bus stop</li> <li>• Absence of safe pedestrian crossing locations</li> <li>• Narrow sidewalks</li> </ul>
Metrowest Blvd at Kirkman Rd	<ul style="list-style-type: none"> <li>• High incidence of pedestrians running across Kirkman Rd between the bus stop and the Walmart at non-designated crossing locations</li> <li>• Large mature trees block lighting of the southbound bus stop</li> <li>• Lack of tree coverage in the median and trail buffer</li> <li>• Narrow sidewalks</li> </ul>
Conroy Rd at Millenia Blvd	<ul style="list-style-type: none"> <li>• Many signs are not properly labeled, are faded, or are missing</li> <li>• Inadequate sidewalk connections and long distances between pedestrian crossings</li> <li>• Observed incidence of cycling on narrow sidewalks</li> <li>• Lack of tree buffering between sidewalk and roadway</li> </ul>
Oak Ridge Rd at Millenia Blvd	<ul style="list-style-type: none"> <li>• Signage along Millenia Boulevard trail is faded</li> <li>• Midblock crossings between transit stops are not signalized and pavement markings are fading</li> <li>• Relatively high-speed limit (40 mph)</li> <li>• Tight stop bar to crosswalk spacing</li> <li>• Narrow pedestrian refuge</li> </ul>





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Figure 11 | International Drive at Kirkman Road Observations and Concerns

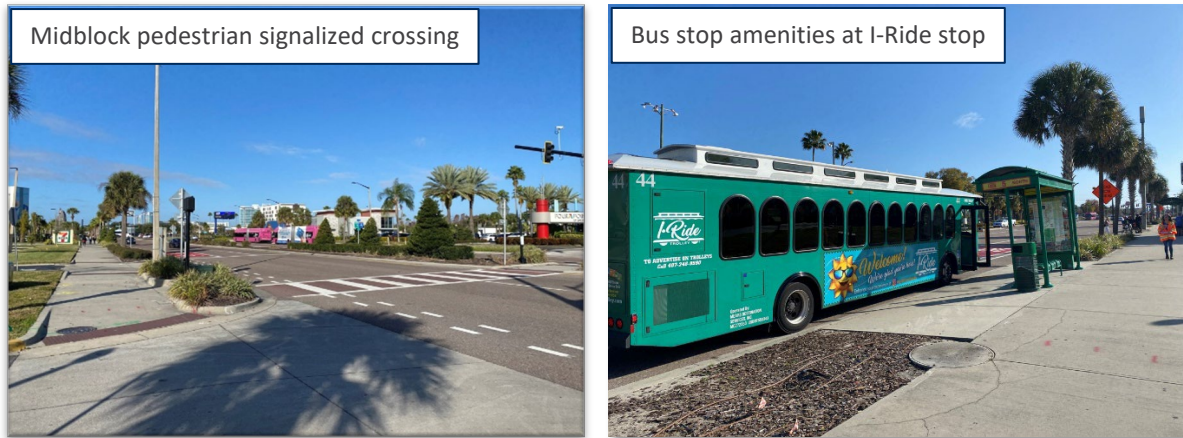


Figure 12 | Raleigh Street at Kirkman Road Observations and Concerns



Figure 13 | Metrowest Boulevard at Kirkman Road Observations and Concerns

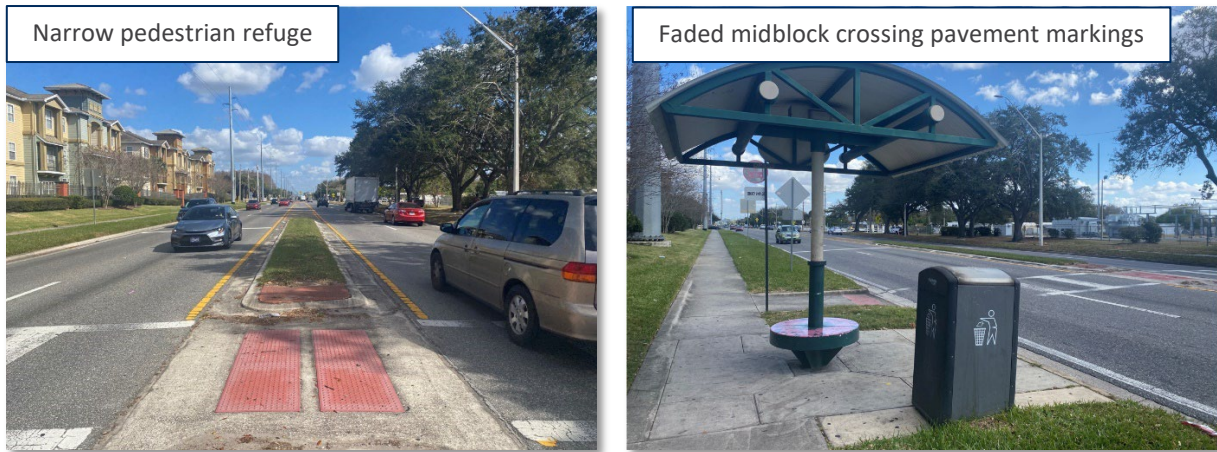


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Figure 14 | Conroy Road at Millenia Boulevard Observations and Concerns



Figure 15 | Oak Ridge Road at Millenia Boulevard Observations and Concerns



## 3.0 Pedestrian Level of Service

The Pedestrian Level of Service (PLOS) is a measure which quantifies comfort and safety levels of existing walkways, allowing objective evaluation of pedestrians' perceptions and responses to the roadway environment. The PLOS for the study area was identified to provide a snapshot of existing walking conditions at major roadways. Figures 16 through 19 show representative examples of PLOS B through PLOS E conditions. The PLOS assessment methodology was originally developed for the Florida Department of Transportation (FDOT) using real-time pedestrian observations of a wide variety of roadway walking conditions. Since its inception, it has been used by myriad agencies and communities throughout Florida and the United States and has been adopted into both the FDOT *Quality/Level of Service Handbook* and the Transportation Research Board's *Highway Capacity Manual*.



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Figure 16 | PLOS B Representative Examples



Figure 17 | PLOS C Representative Examples



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Figure 18 | PLOS D Representative Examples

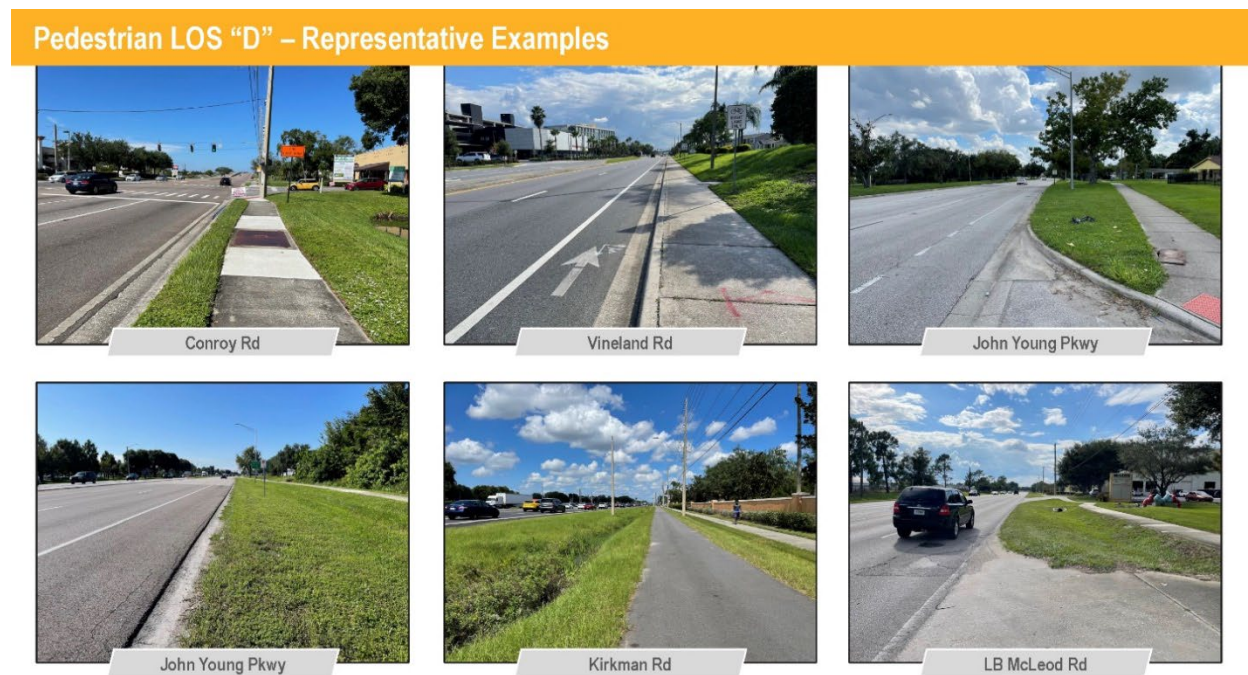
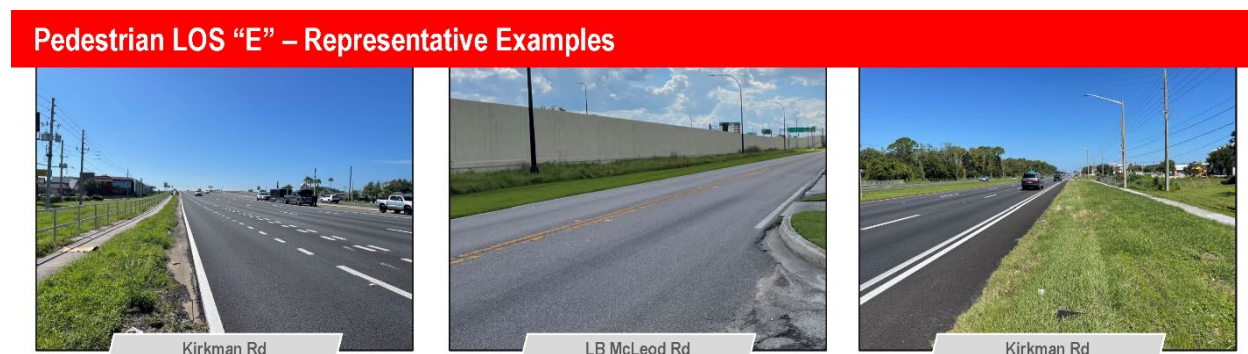


Figure 19 | PLOS E Representative Examples



The PLOS evaluation is based on a variety of roadway traffic and geometric characteristics, focusing on the degree of separation between roadway traffic and the walking environment, including:

- Traffic volume (Annual Average Daily Traffic)
- Traffic speed (posted speed limit)
- Outside travel lane width (feet)
- Paved shoulder or bike lane presence/width (feet)
- Occupied on-street parking (%)
- Sidewalk presence/width (feet)

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- Buffer width between edge of pavement and sidewalk (feet)
- Presence/separation of trees within buffer (feet)

An areawide PLOS analysis was completed for arterial and collector roadways within the southwest Orlando study area. The results indicate a distance-weighted average PLOS score of 3.47 translating to a grade of C for the study network, which compares favorably to other Florida metropolitan areas. Walking conditions in southwest Orlando are aided by the presence of a robust sidewalk network, with sidewalks provided on 87 percent of the arterial and collector system. However, there are still a high number of segments with poor PLOS scores due to a combination of heavy traffic volumes, high speeds, and close proximity of the sidewalk to vehicular traffic. The number of locations with poor scores indicates significant opportunities for improvement. With traffic volumes unlikely to decline, the greatest opportunity to improve walking conditions will be through filling remaining sidewalk gaps and providing additional separation from traffic through wider sidewalks and buffer areas.

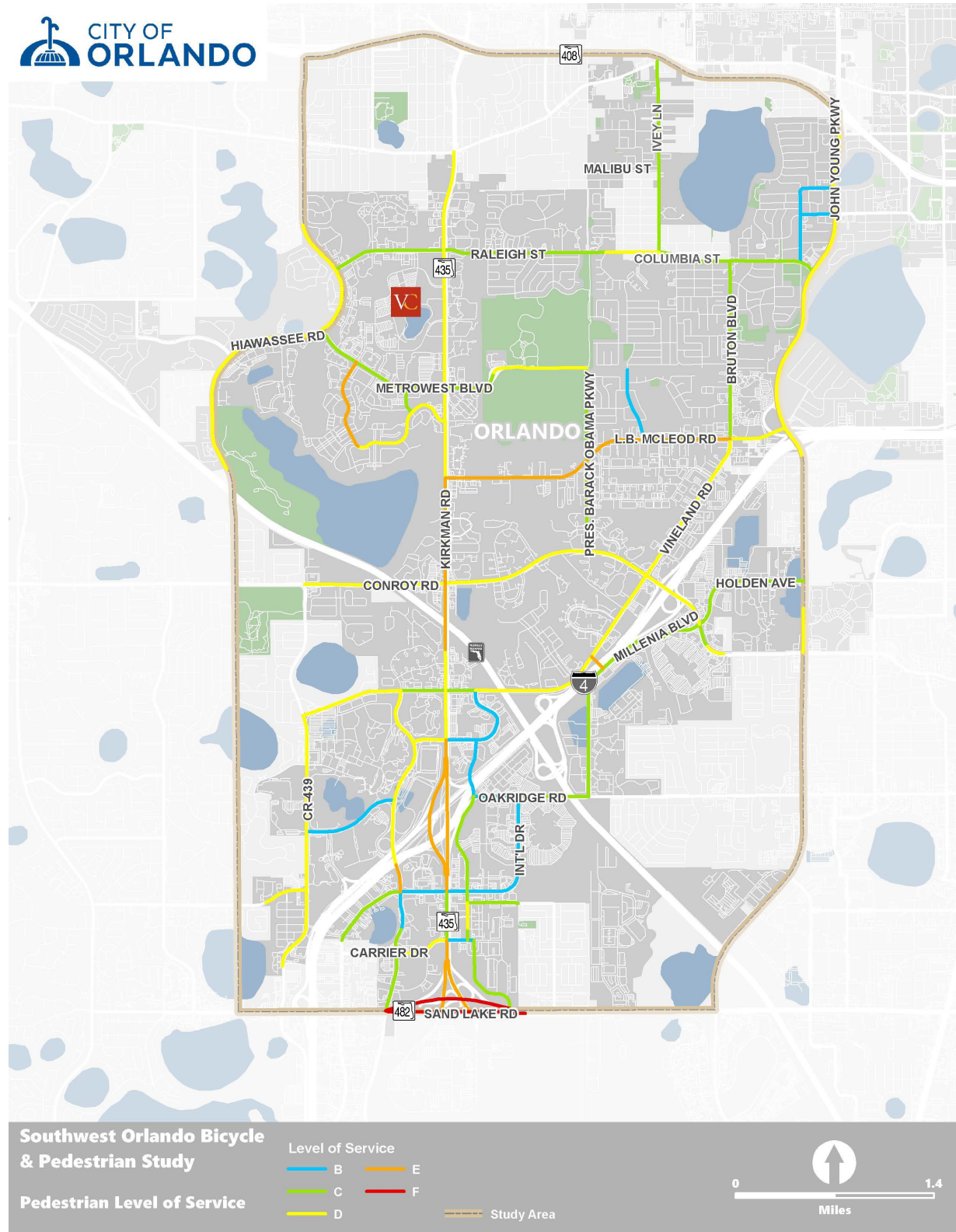
The PLOS analysis results are shown on **Figure 20**. There were no pedestrian facilities that were ranked with a Level of Service “A” within the study area, and a majority of the pedestrian infrastructure is operating under Levels of Service “C” and “D.” In limited cases where the pedestrian level of service grade is different for each side of the street, the map shows the lower result.

Segments of PLOS E were considered priority for improvements. These include those on LB McLeod Road, Robert Trent Jones Drive, and Radebaugh Way. Some PLOS E segments, such as on Kirkman Road and Universal Boulevard, were either considered unfeasible for improvements or already have a trail planned. The only segments with PLOS F are at the Sand Lake Road and Kirkman Road interchange. However, they were not considered, as FDOT already has redesign plans for the interchange. The segments identified were examined, with potential improvements identified.



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Figure 20 | Pedestrian Level of Service Map



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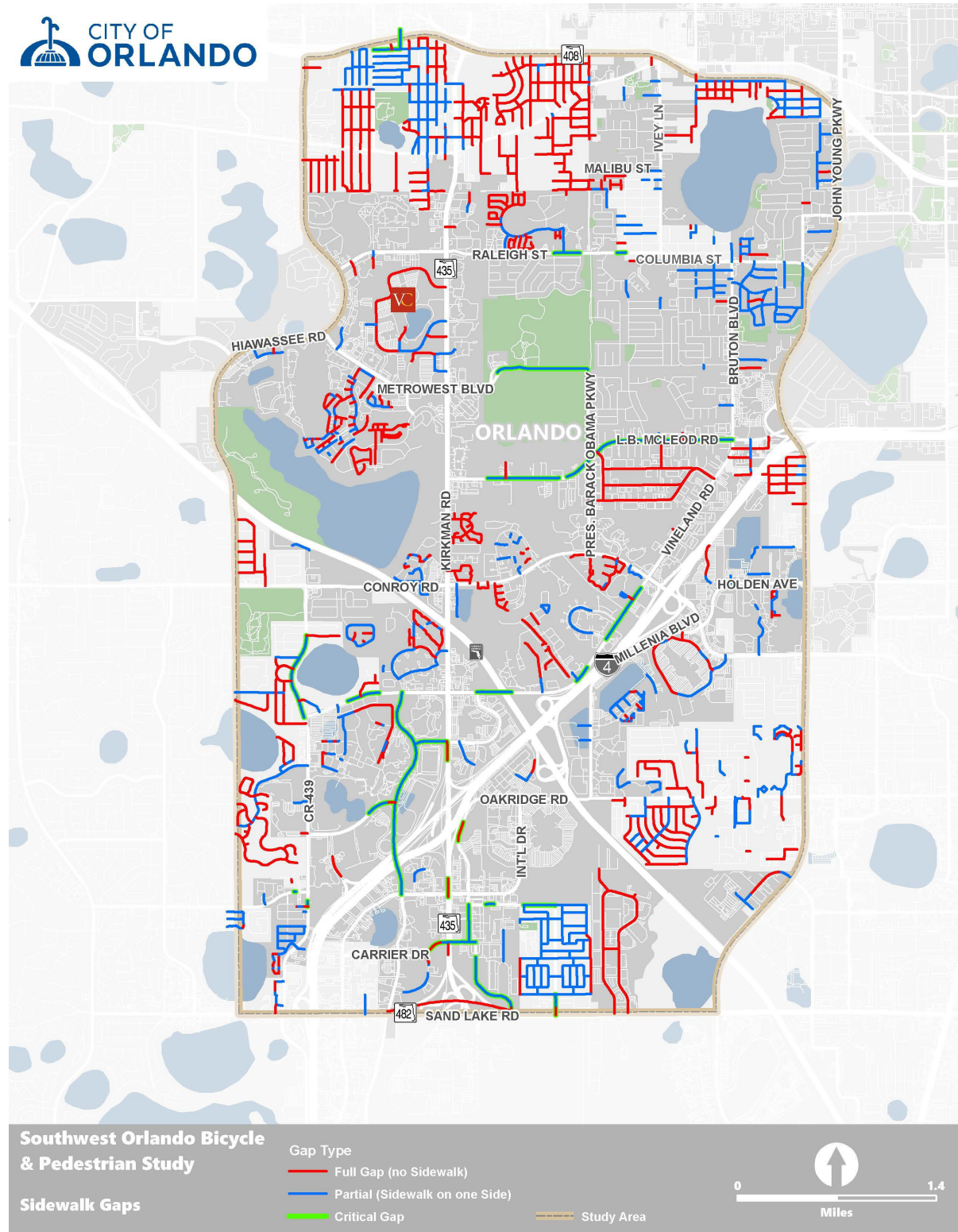
### 4.0 Sidewalk Gaps

A pedestrian friendly environment includes the presence of sidewalks on both sides of the street. Gaps in the pedestrian network and other substandard conditions force pedestrians to walk unsafely and severely limit the comfort of the walking environment. Figure 21 and Figure 22 show the sidewalk gaps within the study area. Figure 21 shows sidewalk gaps by level – whether the sidewalk is missing on both sides or just one side of the street while Figure 22 shows the prioritization level of the sidewalk gaps within the study area. Both maps were taken from an initial critical sidewalk needs analysis conducted as part of the MetroPlan Orlando 2045 Metropolitan Transportation Plan (MTP). Critical sidewalk gaps were identified based on a set of screening criteria combining demographic statistics and geographic proximities to trip generating facilities for each of the sidewalk gaps, with aggregate weighted prioritization scores ranked to determine criticality. Notable sidewalk gaps include LB McLeod Road, Metrowest Boulevard, Vineland Road, Universal Boulevard, and Grand National Drive.



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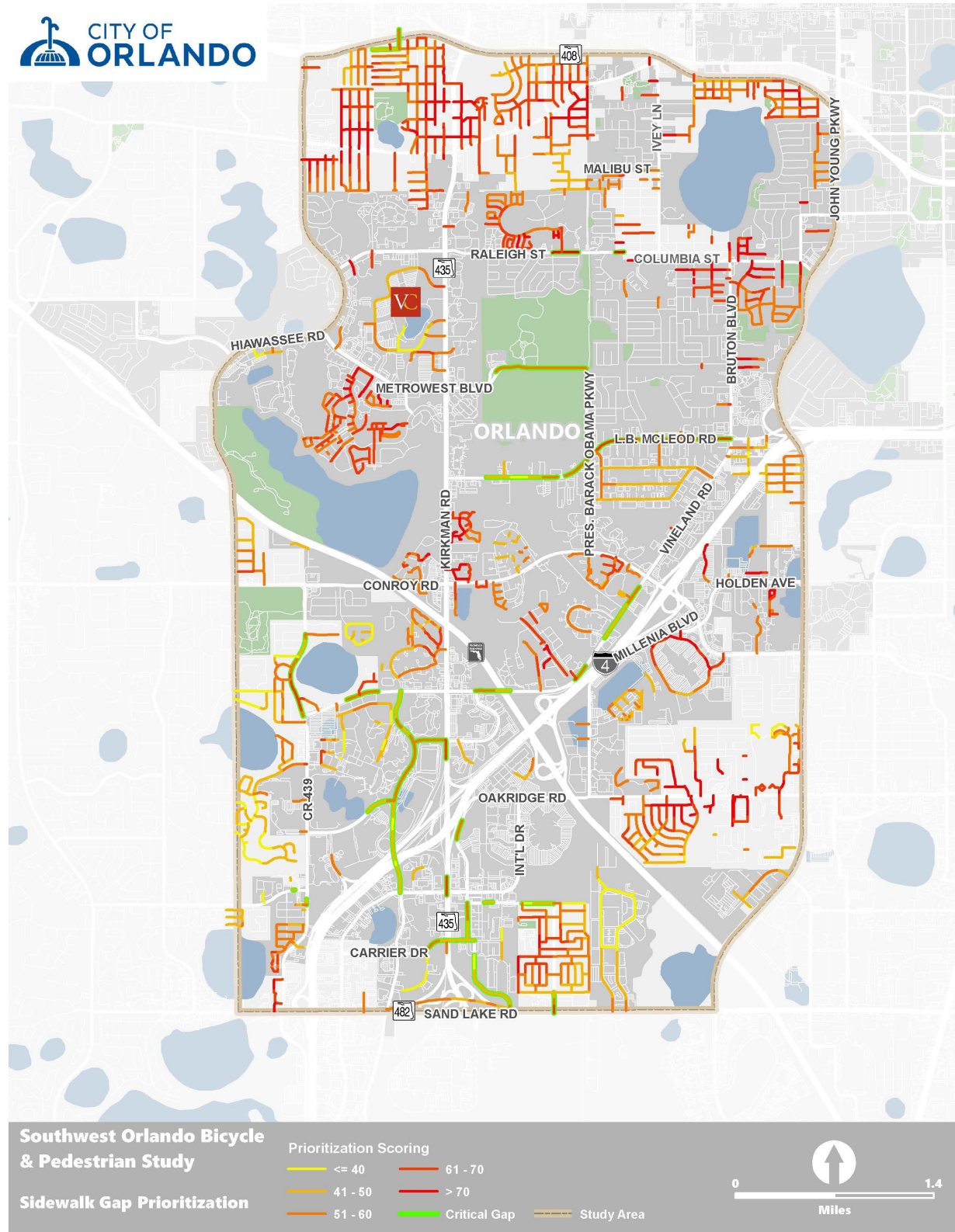
Figure 21 | Sidewalk Gaps by Type





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Figure 22 | Sidewalk Gap by Prioritization Level



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## 5.0 Proposed Improvements and Prioritization

Based on existing deficiencies, a list of potential improvements was developed. Table 4 lists the proposed infrastructure projects. A scoring methodology was identified to evaluate and prioritize these proposed improvements. The evaluation criteria are presented in Table 5. The scores were converted to percentages based on the maximum score. Subsequently, they are averaged to derive a composite score as shown in Table 6.

Table 4 | Proposed Infrastructure Improvements

Project	Description
International Drive at American Way crossing improvements	Shorten midblock vehicle signal phase, install raised midblock crossing
Kirkman Rd shared-path extension	Extend shared path from Raleigh St north to Old Winter Garden Rd
Kirkman Rd at Raleigh St bus stop connection	Connect northbound bus stop pad to sidewalk
Raleigh St midblock crossing	Move eastbound Raleigh St at Kirkman Rd transit stop to the east to be in line with westbound stop, add midblock crossing
Kirkman Rd median & buffer trees	Add trees to median and trail buffer along Kirkman Rd between Old Winter Garden Rd and LB McLeod Rd
Conroy Rd at Millenia Blvd crossing improvements	Add "Yield to Peds" signage and leading pedestrian interval to intersection of Conroy Rd and Millenia Blvd
Conroy Rd trees and shared-path	Add buffer trees and construct shared path on the westbound side of Conroy Rd from I-4 to Eastgate Dr
Millenia Blvd buffer trees	Add buffer trees where feasible between Millenia Lakes Blvd and Millenia Plaza Way
Oak Ridge Rd at Millenia Blvd speed and pedestrian improvements	Along Oak Ridge Rd between Millenia Blvd and Susie Way, install RRFBs at both midblock crossings, narrow lanes, lower speed limit to 35, convert two-way left turn lane (TWLTL) into median, increase stop bar to crosswalk spacing
Robert Trent Jones Dr buffer trees	Plant trees in sidewalk buffers along Robert Trent Jones Dr between Metrowest Blvd and Arnold Palmer Dr
LB McLeod Rd trail	Add shared-path along LB McLeod Rd between Kirkman Rd and Bruton Blvd
LB McLeod Rd creek bridge	Construct pedestrian bridge over creek, connecting existing sidewalks on westbound side along LB McLeod Rd between Enterprise Rent-A-Car and Public Storage
Universal Blvd sidewalk	Install sidewalk along north side of Universal Blvd between the Universal LYNX bus hub and Tom Williams Way.
Metrowest Blvd sidewalk	Install sidewalk on south side with appropriate crosswalks along Metrowest Blvd between the Eagle Nest Elementary School and President Barack Obama Pkwy
Vineland Rd sidewalk gap closure	Install sidewalk on Vineland Rd where gaps occur, between Radebaugh Way and Cypress Creek Blvd



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Project	Description
Vineland Rd multi-use trail	Widen south side sidewalk into a multi-use trail along Vineland Rd between Radebaugh Way and the Shingle Creek Trail
Vineland Rd sidewalk	Install sidewalk on north side of Vineland Rd between Shingle Creek and the Porsche dealer
Vineland Rd WB streetscape buffer	Add streetscape buffer between Walden Circle (south intersection) and Shingle Creek Trail
Grand National Dr sidewalks	Install sidewalks at gap on both sides of Grand National Drive by removing center turn lane and extra northbound lane, between Fun Spot Way and Oak Ridge Rd
Carrier Dr sidewalk	Install sidewalk on north side of Carrier Drive between Lakehurst Dr and Kirkman Rd
Greenbriar Pkwy sidewalk	Install sidewalk on west side of Greenbriar Pkwy between the Sand Lake West office park and Sand Lake Rd
Vanguard St sidewalk	Install sidewalk on south side of Vanguard St between the Entertainment Benefits Group building and Municipal Dr

Table 5 | Evaluation Criteria

Criterion	Scoring	Scoring Description
Transit priority area	0 to 2	Number of priority transit stop locations
Current PLOS	1 to 5	Initial score of A to E converted to numerical scale of 1 to 5, respectively
Sidewalk gaps	0 to 2	Sidewalks on both sides (0), sidewalk on one side (1), and no sidewalks (2)
High Injury Network	0 to 1	Score of 1 if on the High Injury Network, otherwise 0
New PLOS	0 to 2	Change in numerical value of PLOS with improvements, maximum of 2
Pedestrian crossing	0 to 1	Improves the pedestrian crossing experience - Yes (1) or No (0)
Cost effectiveness	0 to 2	Major cost (0) to low cost (2)
Right-of-way (ROW) availability	0 to 2	Insufficient ROW (0); sufficient ROW with cross section repurposing (1); sufficient ROW with no reconfigurations (2)



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Table 6 | Proposed Improvements Scoring

Project	Transit priority areas	Current PLOS	Sidewalk Gaps	High Injury Network	New PLOS	Pedestrian Crossing	Cost Effectiveness	ROW Availability	Composite Score
International Drive at American Way crossing improvements	50%	40%	0%	0%	0%	100%	100%	100%	49%
Kirkman Rd shared-path extension	50%	80%	0%	100%	0%	0%	50%	100%	48%
Kirkman Rd at Raleigh St bus stop connection	50%	80%	0%	100%	0%	0%	100%	100%	54%
Raleigh St midblock crossing	50%	60%	0%	0%	0%	100%	100%	100%	51%
Kirkman Rd median & buffer trees	100%	80%	0%	100%	50%	100%	100%	100%	79%
Conroy Rd at Millenia Blvd crossing improvements	50%	80%	0%	0%	0%	100%	100%	100%	54%
Conroy Rd trees and shared- path	50%	80%	0%	0%	50%	0%	50%	100%	41%
Millenia Blvd buffer trees	50%	60%	0%	0%	0%	0%	100%	100%	39%
Oak Ridge Rd at Millenia Blvd speed and pedestrian improvements	50%	60%	0%	0%	0%	100%	50%	50%	39%
Robert Trent Jones Dr buffer trees	0%	100%	0%	0%	50%	0%	100%	100%	44%
LB McLeod Rd trail	0%	100%	50%	0%	100%	0%	50%	100%	50%



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Project	Transit priority areas	Current PLOS	Sidewalk Gaps	High Injury Network	New PLOS	Pedestrian Crossing	Cost Effectiveness	ROW Availability	Composite Score
LB McLeod Rd creek bridge	0%	60%	50%	0%	0%	0%	50%	100%	33%
Universal Blvd sidewalk	0%	80%	50%	100%	0%	0%	50%	50%	41%
Metrowest Blvd sidewalk	0%	80%	50%	0%	50%	100%	50%	100%	54%
Vineland Rd sidewalk gap closure	0%	100%	50%	0%	50%	0%	50%	100%	44%
Vineland Rd multiuse trail	0%	80%	0%	0%	0%	0%	50%	50%	23%
Vineland Rd sidewalk	0%	80%	50%	0%	0%	0%	50%	100%	35%
Vineland Rd WB streetscape buffer	0%	80%	0%	0%	0%	0%	50%	50%	23%
Grand National Dr sidewalks	0%	60%	100%	0%	0%	0%	50%	50%	33%
Carrier Dr sidewalk	0%	80%	50%	0%	100%	0%	50%	100%	48%
Greenbriar Pkwy sidewalk	0%	60%	50%	0%	50%	0%	50%	100%	39%
Vanguard St sidewalk	0%	60%	50%	0%	50%	0%	50%	100%	39%



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The scores most favor Kirkman Road, as it is a high-speed, six-lane arterial, has high transit ridership, and has segments on the High Injury Network. The projects with the lowest score are on Vineland Road in the westbound direction, as the only indicator of need is the PLOS, and they would involve space reallocation within the right-of-way. In the next section, the top five scoring projects will be recommended for short term implementation.

Other concerns were identified but would require further study before a project is proposed. Furthermore, some improvements would fall into the maintenance category. Studies and maintenance improvements are listed in Table 7.

Table 7 | Studies and Maintenance Improvements

Project	Description	Score
<b>Bruton Blvd crosswalk study</b>	Conduct a crosswalk study along Bruton Blvd between Cepeda St and Nimons St	58%
<b>Bruton Blvd sidewalk buffer</b>	Study possible road diet to provide buffer between street and sidewalk along Bruton Blvd between Columbia St and LB McLeod Rd	45%
<b>LB McLeod Rd crosswalk study</b>	Conduct a crosswalk study along LB McLeod Rd between Rio Vista Ave and John Young Pkwy	60%
<b>Cason Cove crosswalk study</b>	Conduct a crosswalk study along Cason Cove Dr between Millennium Cove and Conroy Rd	50%
<b>Conroy Rd crosswalk study</b>	Conduct a crosswalk study along Conroy Rd between Cason Cove Dr and Emerald Forest Way	60%
<b>Kirkman Rd crosswalk study</b>	Study speed and midblock crossing improvements along Kirkman Road between Old Winter Garden Rd and LB McLeod Rd	79%
<b>Conroy Rd at Millenia Blvd signage audit</b>	Signage audit at the intersection of Conroy Rd and Millenia Blvd, reviewing clutter, visibility, etc.	54%
<b>Kirkman Rd tree trimming</b>	At the Kirkman Rd and Metropolis Way southbound bus stop, trim trees to reduce lighting obstruction	41%

## 6.0 Recommendations

Focusing on infrastructure improvements, the five top-scoring projects are listed in Table 8. Figure 23 provides a map of the proposed infrastructure projects and highlights the top five. The highest scoring project is planting trees along Kirkman Road in both the median and trail buffer. The area includes two transit priority areas and overlaps with the High Injury Network. Trees provide shading for comfort while walking and have the potential to slow traffic, thereby improving pedestrian safety. Three projects initially tied for #2 and were subsequently sequenced based on cost (favoring the least expensive improvement). The Conroy Road at Millenia Boulevard and Kirkman Road at Raleigh Street projects are relatively inexpensive and include transit priority areas. The Metrowest Boulevard project would close a sidewalk gap, improve PLOS, and have plenty of right-of-way availability. Finally,



## Walking Conditions Technical Memorandum

the Raleigh Street midblock crossing project is in a high transit ridership area near Valencia College West Campus and would improve the pedestrian crossing experience for a relatively low cost. These projects could be implemented in the near-term, would be cost effective, and would provide significant pedestrian safety benefits.

Table 8 | Recommended Pedestrian Infrastructure Projects

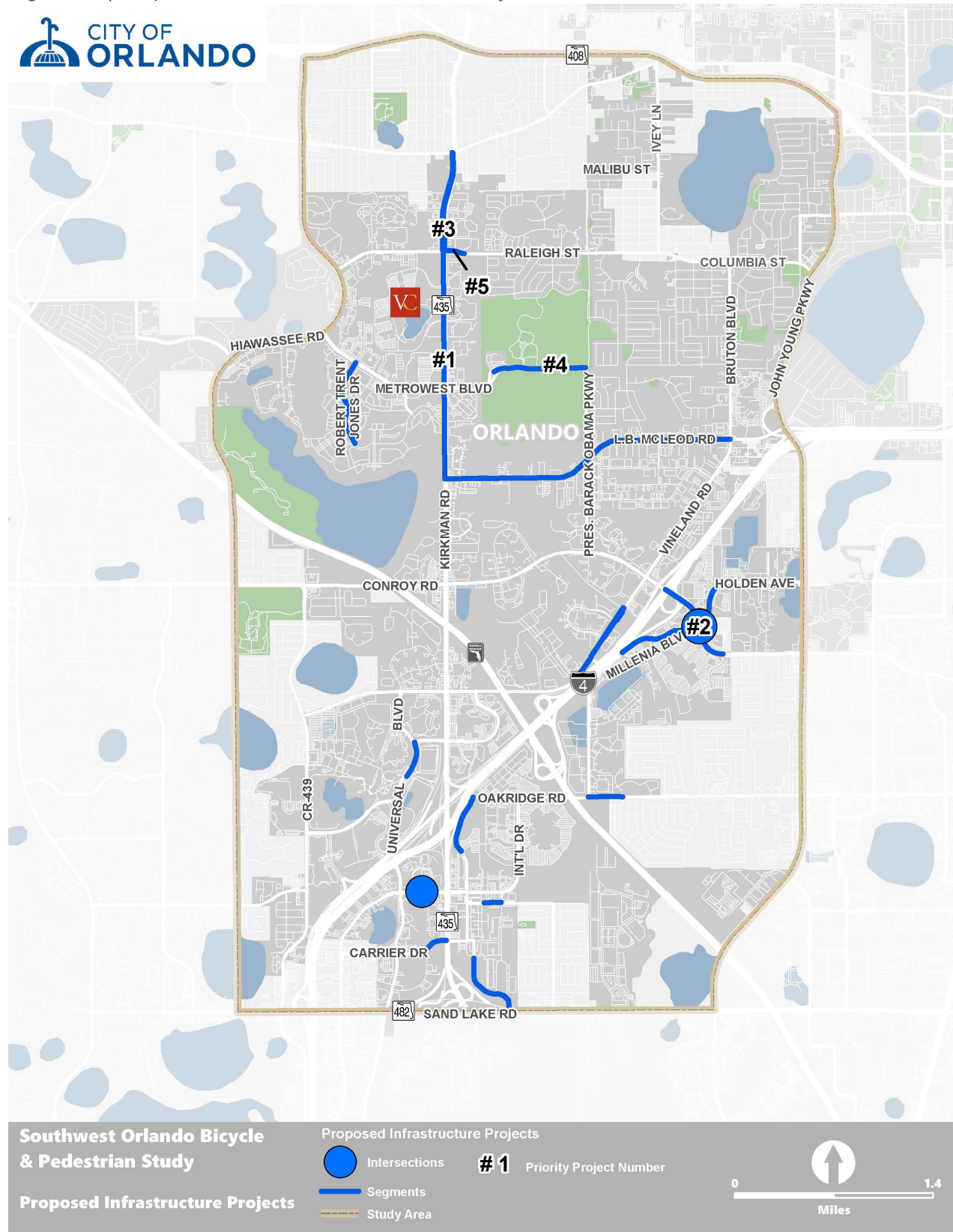
Project	Description	Score	Rank*
<b>Kirkman Road median &amp; buffer trees</b>	Add trees to median and trail buffer along Kirkman Rd between Old Winter Garden Rd and LB McLeod Rd	79%	1
<b>Conroy Rd at Millenia Blvd crossing improvements</b>	Add "Yield to Peds" signage and leading pedestrian interval to intersection of Conroy Road and Millenia Blvd	54%	2
<b>Kirkman Rd at Raleigh St bus stop connection</b>	Connect northbound bus pad to sidewalk at south side	54%	3
<b>Metrowest Blvd sidewalk</b>	Install sidewalk on south side of street with appropriate crosswalks along Metrowest Blvd between the Eagle Nest Elementary School and President Barack Obama Pkwy	54%	4
<b>Raleigh St midblock crossing</b>	Move eastbound Raleigh St at Kirkman Rd bus stop to the east to be in line with westbound stop, then add midblock crossing	51%	5

\* Projects with same score were ranked based on anticipated cost (low to high)



# Walking Conditions Technical Memorandum

Figure 23 | Proposed Pedestrian Infrastructure Projects





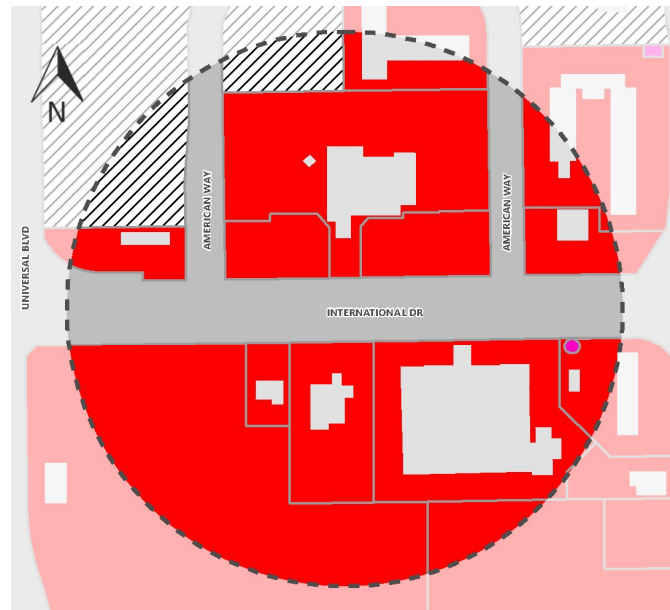
# Walking Conditions Technical Memorandum

## Appendix A Detailed Transit Stop Assessment



# 1

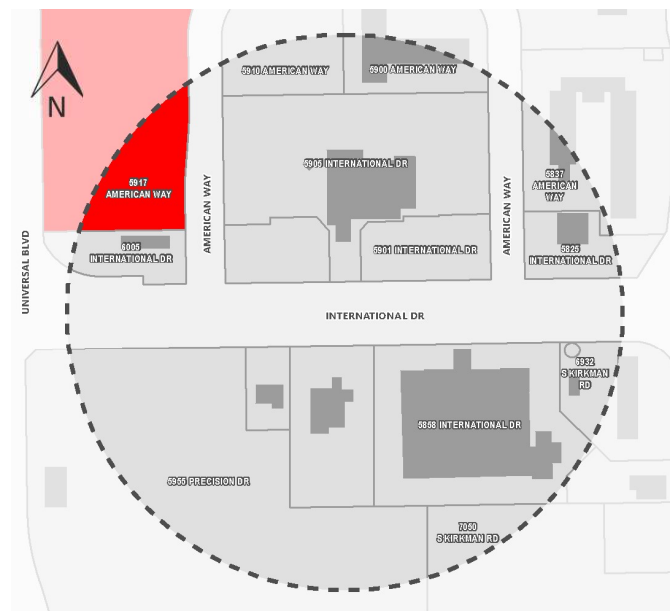
# INTERNATIONAL DR @ KIRKMAN RD



Land Use & Zoning



Transit Ridership



Parcels & Buildings



Bike & Pedestrian Facilities

Kirkman Road at International Drive (I-Drive) stop area features land use that is exclusively commercial. Within this study area, the existing sidewalk network provides walking connections along main roadways, and there are one-way bike lanes along both sides of I-Drive with a signalized pedestrian crossing midblock. In this area there is one vacant parcel zoned for commercial use that could increase the amount of vehicular travel and mass transit needs in the area when developed. Proposed improvements in the City of Orlando Bike Plan will provide connections along side streets, improving access to transit for bicyclists.

The area is served by LYNX and the I-Ride Trolley - International Drive Resort Area transit circulator. Of the two LYNX stops, the eastbound has the highest average weekday ridership. Both stops offer narrow shelters but do not have seating. The two I-Ride stops do offer both shelter and seating, and it has been observed that patrons (especially elderly individuals) for LYNX will wait at the I-Ride stops and end up missing their LYNX bus.

Important aspects to note:

- The Business Access and Transit (BAT) lanes along I-Drive end east of the intersection with Kirkman Road
- The bus pad at the eastbound LYNX stop is not long enough to accommodate articulated busses
- Neither LYNX bus stops provide seating
- Sidewalks spanning each direction of I-Drive are wide and comfortable to the user



Bus bay too short for articulated bus.



Midblock pedestrian signalized crossing.



**SOUTHWEST BIKE AND PEDESTRIAN STUDY**

# 1

## INTERNATIONAL DR @ KIRKMAN RD







### Recommended Improvements:

#### Short Term

- Improvements to LYNX stop amenities (lean bar improvements, wider shade cover, adding benches, and updating faded signage).
- Evaluate shortening the midblock signal cycle to change more quickly for pedestrian access.
- Assess LYNX bus schedules to provide more time for pedestrians getting off a bus on one side to make the transfer over to the stop on the opposite side of I-Drive.

#### Long Term

- Consider elongating the pad at the eastbound LYNX stop to accommodate articulated busses.
- Adding a raised pedestrian crossing to signalized midblock crossing improve transfer access and encourage slower travel speeds

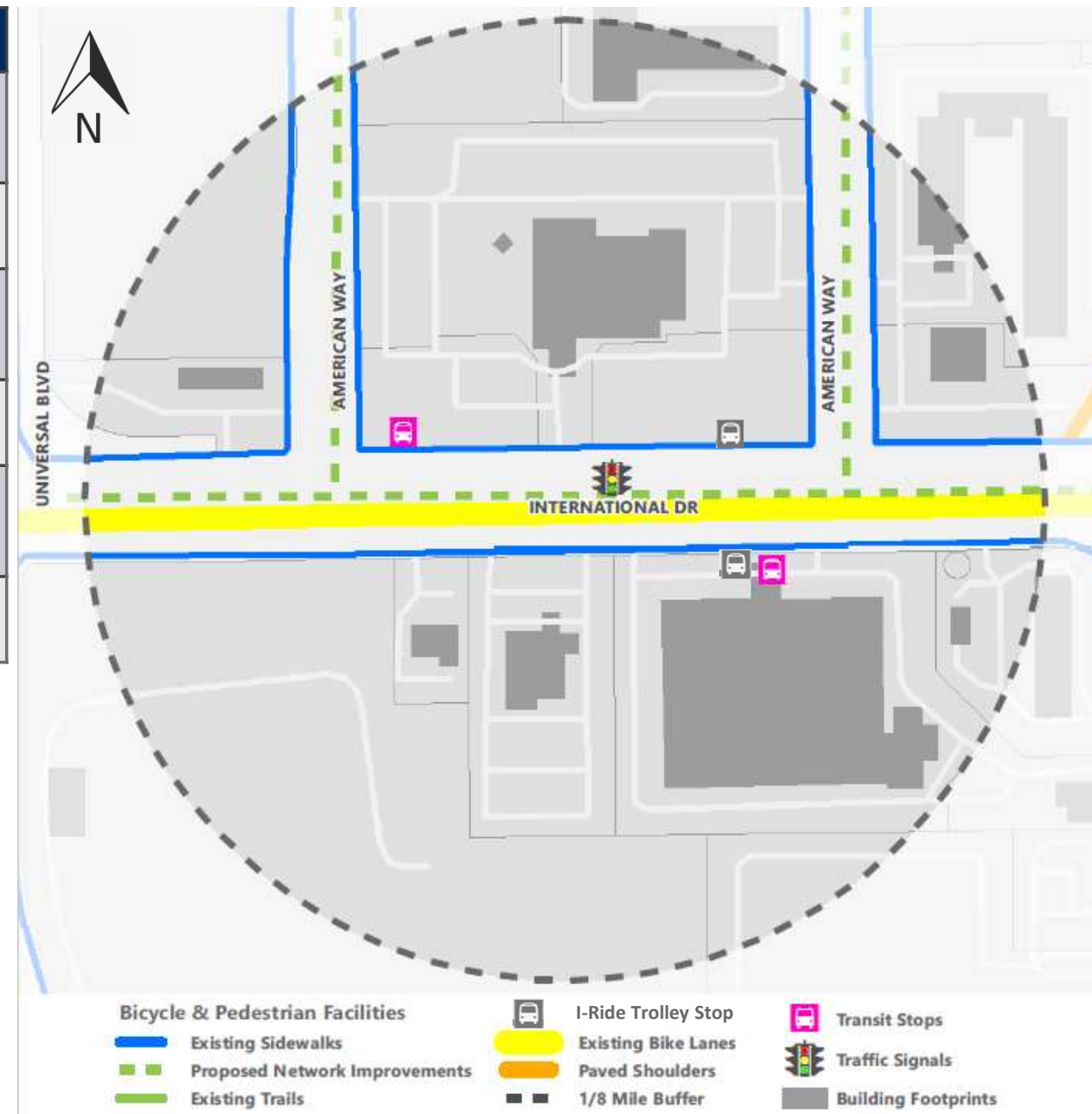
Location Metrics		
	Walk Score (walkscore.com)	<b>57 Somewhat Walkable</b> Some errands can be accomplished on foot
	Bicycle Comfort (walkscore.com)	<b>64 Bikeable</b> Some bike infrastructure
	Overall Connectivity (walkscore.com)	<b>46 Some Transit</b> A few nearby public transportation options
	Residential Units	Single Family – 0 Multi Family - 0
	Employment	Industrial – 28 Office – 56 Retail – 1,429
	Key Destinations	Hotels, Restaurants, Mini Golf



Midblock pedestrian signalized crossing.

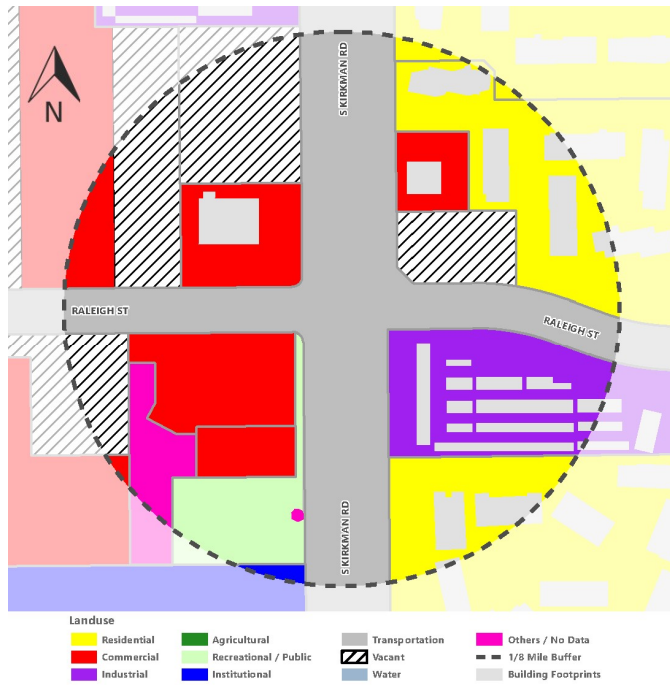


Bus stop amenities at I-Ride stop.



# 2

## RALEIGH ST @ KIRKMAN RD



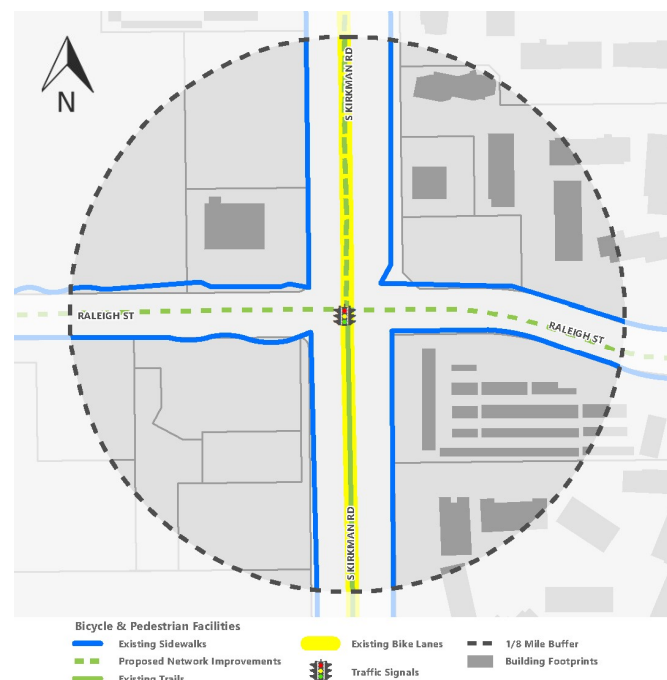
Land Use & Zoning



Transit Ridership



Parcels & Buildings



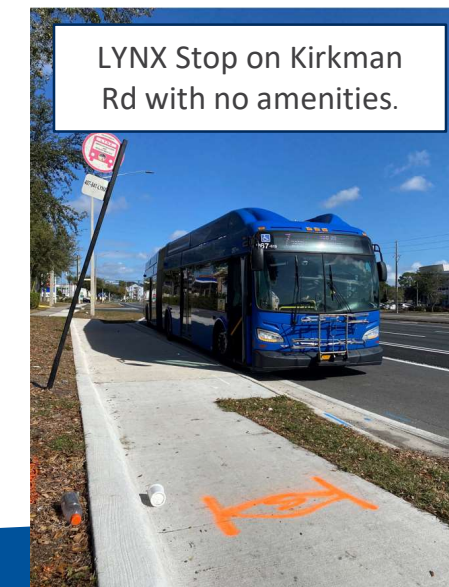
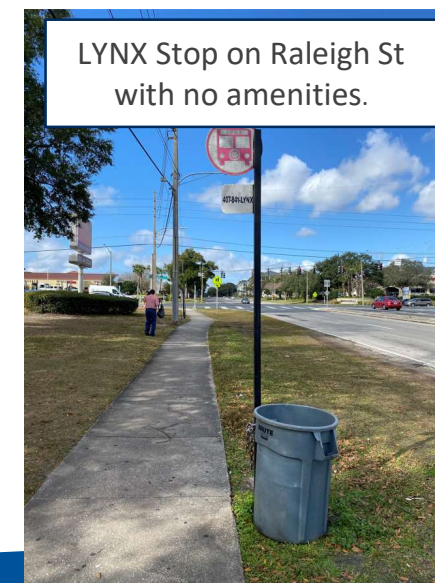
Bike & Pedestrian Facilities

The intersection of Raleigh Street and Kirkman Road features a mix of land uses including residential developments to the east, mostly commercial to the west, and a portion of industrial on the southeast side. Along Kirkman Road there is a newly installed 10-foot-wide multi-use trail that begins south of the intersection and continues south to LB McLeod Road. A five-foot wide sidewalk is present on the western side, and there are buffered bike lanes on each side of the roadway. There are four vacant parcels in this area, all zoned commercial that could increase the amount of vehicular travel and mass transit needs in the area when developed.

There are four LYNX bus stops in this analysis area, including two on both sides of the northern portion of Kirkman Road, and the two with the highest ridership on both sides of Raleigh Street east of Kirkman Road.

Important aspects to note:

- At the LYNX stop in the southbound direction, north of the intersection, articulated busses hang out of the pull-out bay and into the road
- Most LYNX stops in this area lack amenities (shelter, seating, trash cans)
- Several LYNX stops lack logical connections to the sidewalk



# 2

## RALEIGH ST @ KIRKMAN RD







### Recommended Improvements:

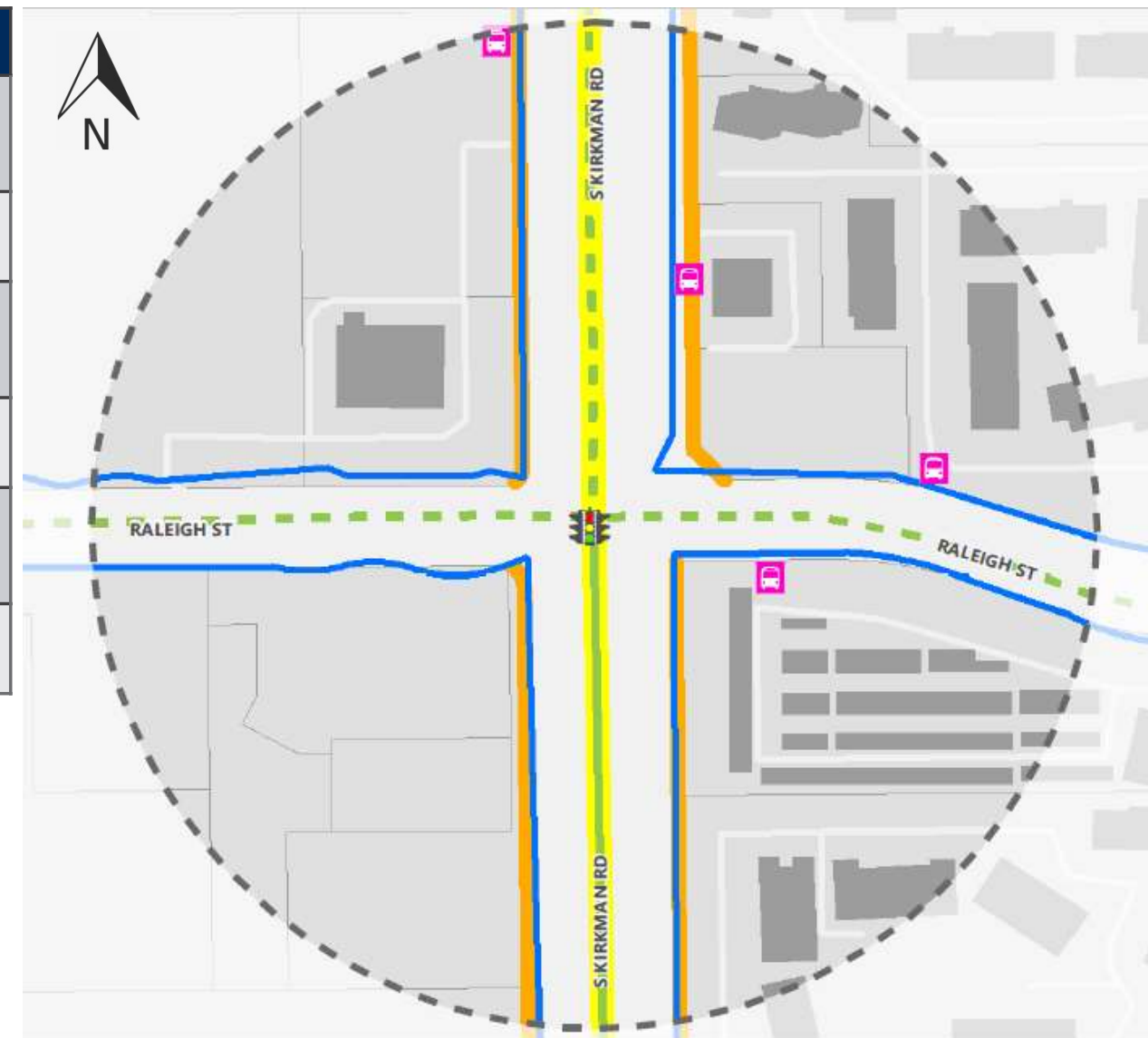
#### Short Term

- Add amenities such as shelters, benches and trash cans to all four stops in this area.
- Consider implementing shade trees in the buffer space between the new trail and Kirkman Road to provide increased comfort to the bike or pedestrian user, and to provide enclosure on Kirkman to encourage slower travel speeds.

#### Long Term

- Extend the 10'-foot-wide multi-use trail north and ensuring connections are made between the existing LYNX stop.
- Extend the pull-out bay at the southbound LYNX stop to ensure that articulated busses are accommodated correctly.
- Connect the south side of the northbound bus pad on Kirkman Road to existing sidewalk to better improve connections for bike and pedestrian users.
- Consider shifting the eastbound Raleigh Street LYNX stop to the east and adding a midblock crossing to provide better and safer connections to the apartment complex across the street.
- Conduct study for midblock crossing opportunities to determine feasibility along Kirkman Road.

Location Metrics		
	Walk Score (walkscore.com)	<b>52 Somewhat Walkable</b> Some errands can be accomplished on foot
	Bicycle Comfort (walkscore.com)	<b>52 Bikeable</b> Some bike infrastructure
	Overall Connectivity (walkscore.com)	<b>35 Some Transit</b> A few nearby public transit options
	Residential Units	Single Family – 3 Multi Family - 1,592
	Employment	Industrial – 51 Office – 909 Retail – 1,763
	Key Destinations	Residential apartments, 24 Hour Fitness, Wawa, Walgreens



**Bicycle & Pedestrian Facilities**

- Existing Sidewalks (Blue line)
- Proposed Network Improvements (Green dashed line)
- Existing Trails (Green solid line)
- Existing Bike Lanes (Yellow line)
- Paved Shoulders (Orange line)
- 1/8 Mile Buffer (Black dashed line)
- Transit Stops (Bus icon)
- Traffic Signals (Traffic light icon)
- Building Footprints (Grey area)



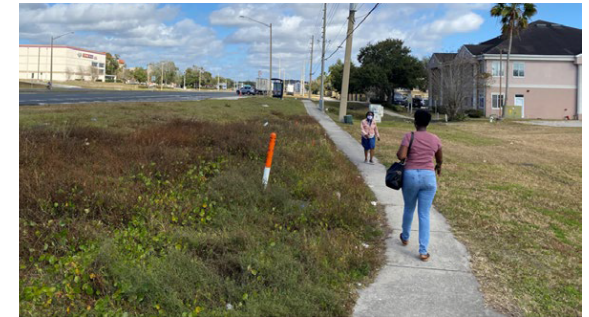
LYNX riders waiting in shade of tree instead of at stop.



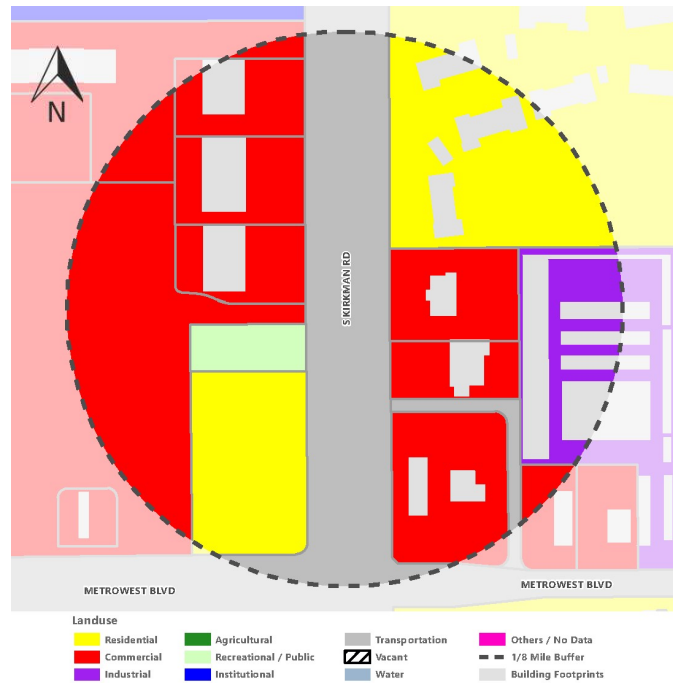
Missing connection to sidewalk from bus bay.



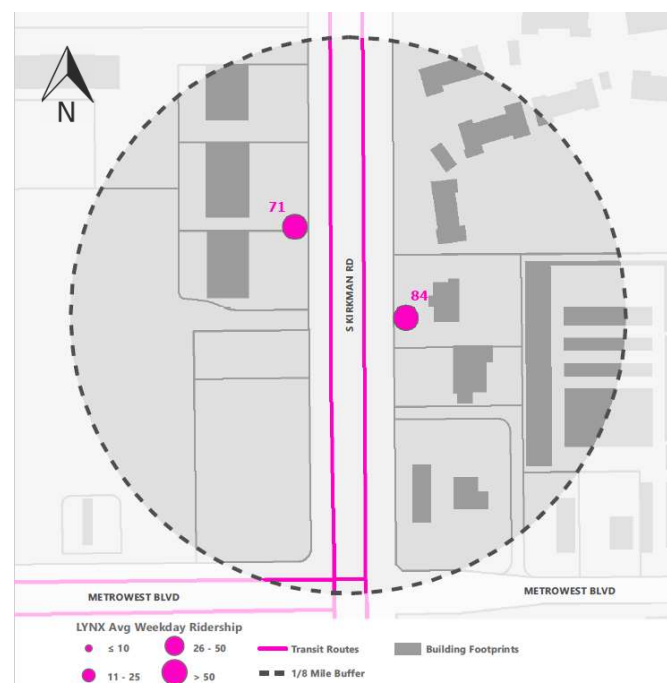
Narrow sidewalk.



**SOUTHWEST BIKE AND PEDESTRIAN STUDY**



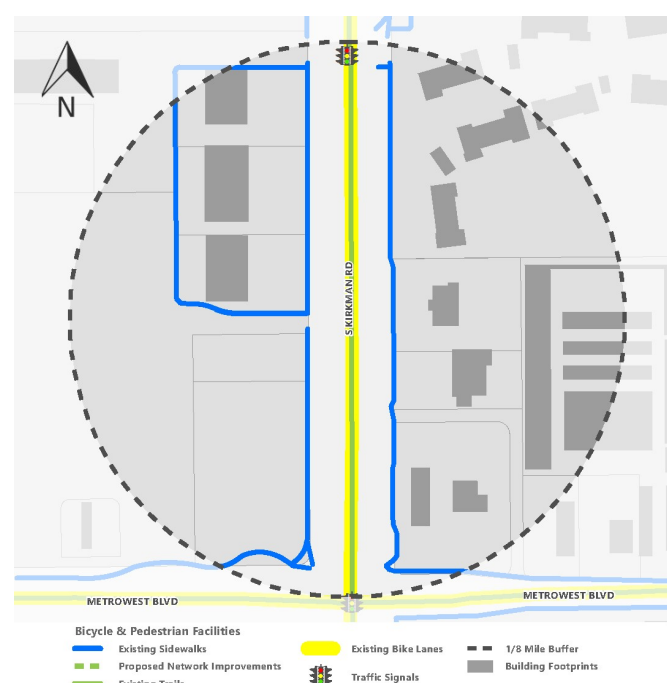
Land Use & Zoning



Transit Ridership



Parcels & Buildings



Bike & Pedestrian Facilities

The Kirkman Road at Metrowest Boulevard stop area features a mix of predominantly commercial and residential land uses. This portion of Kirkman Road has a 10-foot-wide multi-use trail on the eastern side, a five-foot-wide sidewalk on the western side, and buffered bike lanes on both sides of the roadway. There is a grass median in the roadway that ranges from 22 to 28 feet wide. In this area there is a small linear parcel of vacant land that is zoned commercial.

There are two LYNX bus stops in this area with relatively similar average daily ridership, but the stop on the eastern side of Kirkman Road has slightly higher ridership.

Important aspects to note:

- Individuals getting off buses at the stop on the eastern side of Kirkman Road often run across the roadway, through the median to access the Walmart Plaza on the western side of Kirkman Road.
- Large established trees block lighting of the southbound bus stop which may pose safety hazards.

LYNX stop on Kirkman Rd with no amenities.



Bus bay missing sidewalk connection.



# 3

## METROWEST BLVD @ KIRKMAN RD







### Recommended Improvements:

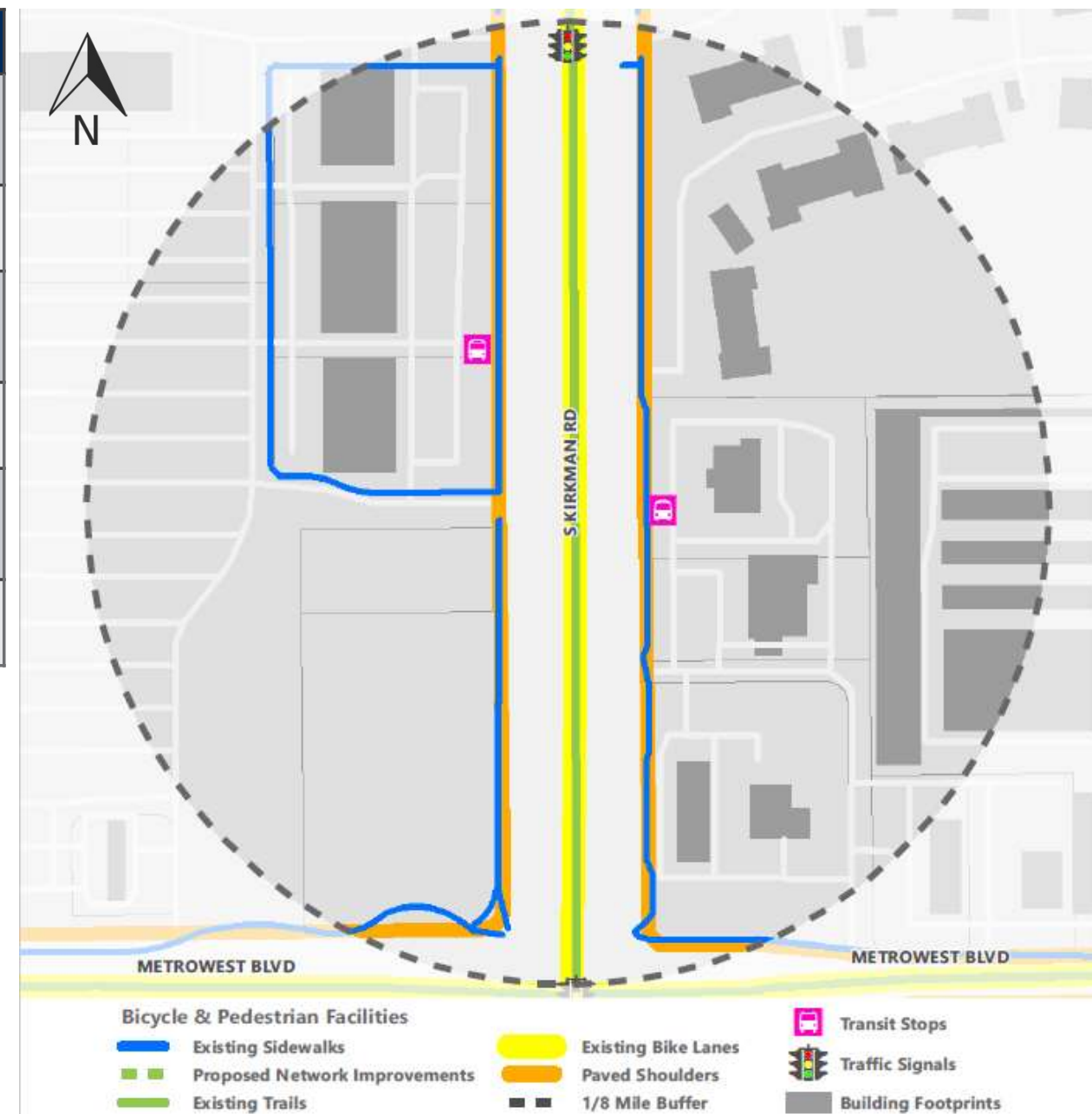
#### Short Term

- Adding/ensuring the availability of amenities such as shelters, benches, and trash cans at all stops.
- Consider assessing the existing tree growth for blockage of lighting and trim trees accordingly.

#### Long Term

- Consider installing a HAWK or RRFB as a midblock crossing for pedestrians across Kirkman Rd
- Consider speed management treatments to encourage slower traffic speeds which would improve the safety and comfortability of bike and pedestrian users.
- Consider adding landscaping to the median to create roadway enclosure and encourage slower traffic speeds.
- Consider extending the length of both LYNX bus pull-out bays to better accommodate articulated busses

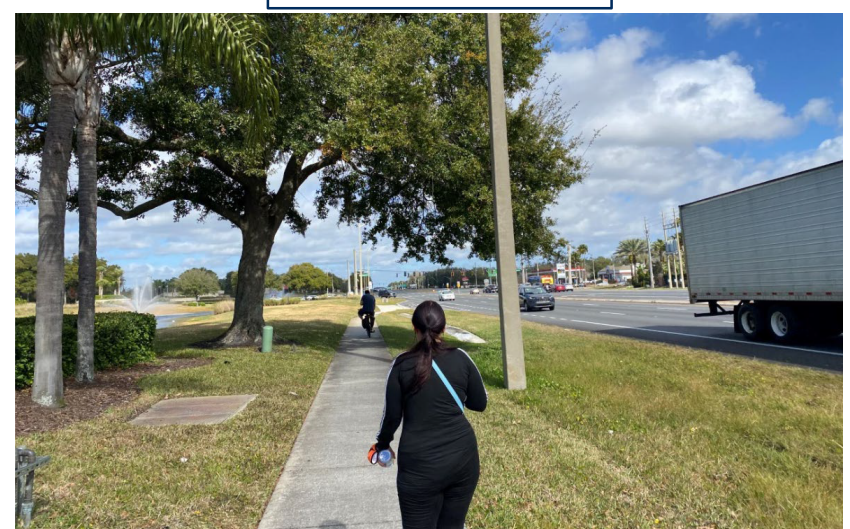
Location Metrics		
	Walk Score (walkscore.com)	<b>61 Somewhat Walkable</b> Some errands can be accomplished on foot
	Bicycle Comfort (walkscore.com)	<b>72 Very Bikeable</b> Biking is convenient for most trips
	Overall Connectivity (walkscore.com)	<b>34 Some Transit</b> A few nearby public transportation options
	Residential Units	Single Family – 113 Multi Family – 4,095
	Employment	Industrial -76 Office – 1,004 Retail – 2,387
	Key Destinations	Walmart, Dollar Tree, Restaurants



Pedestrian crossing against traffic.

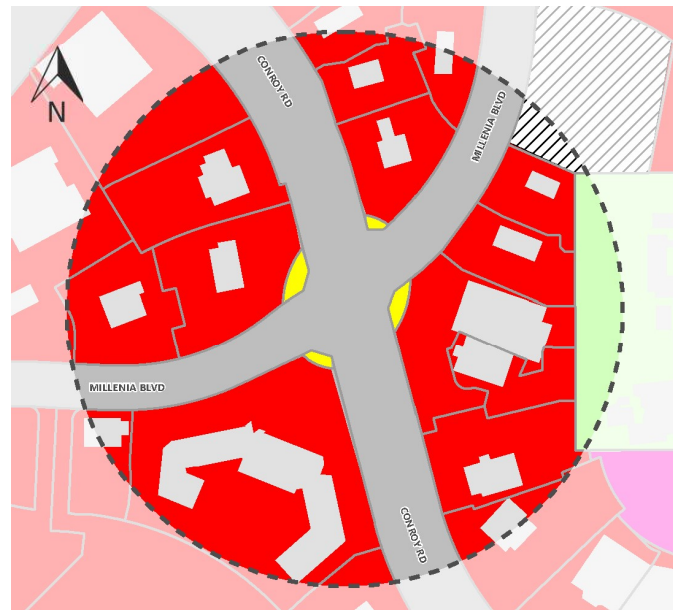


Narrow sidewalk.



# 4

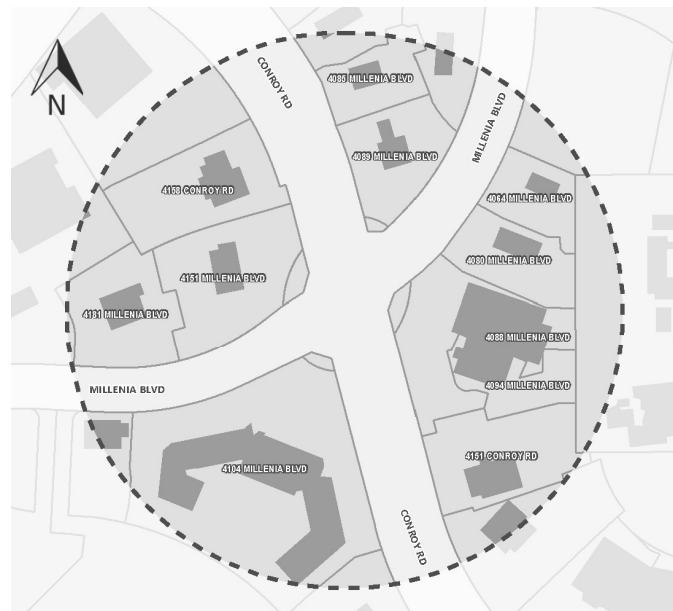
## CONROY RD @ MILLENIA BLVD



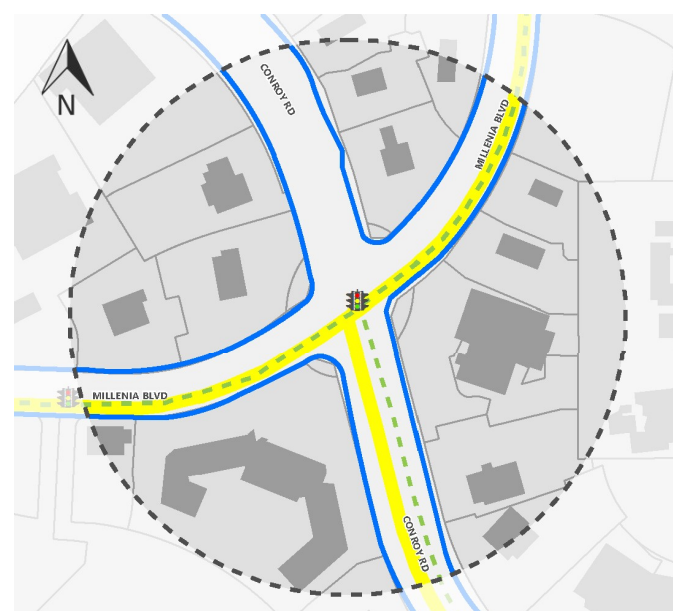
Land Use & Zoning



Transit Ridership



Parcels & Buildings



Bike & Pedestrian Facilities

The intersection of Conroy Road and Millenia Boulevard features land use that is largely commercial with some recreational/public zoning in the far eastern portion of the study area. There are one-way bike lanes on the length of Millenia Boulevard and on the portion of Conroy south of the intersection. There are currently no vacant parcels in this area that could be developed.

There are five LYNX bus stops within this area. Four are on Conroy Road, with two to the north of the intersection and two to the south of the intersection. There is one LYNX stop on the westbound direction of Millenia Boulevard. The stop on the southwest side of Conroy Road has the highest average annual daily ridership.

Important aspects to note:

- There appears to be a problem with signage in this area. Many signs not properly labeled, are faded, or are missing.
- There are several opportunities to improve sidewalk connections and provide safer and more frequent pedestrian crossing opportunities within this study area.

Mislabeled crossing signs.



Uplifted sidewalk.





# 4

## CONROY RD @ MILLENIA BLVD







### Recommended Improvements:

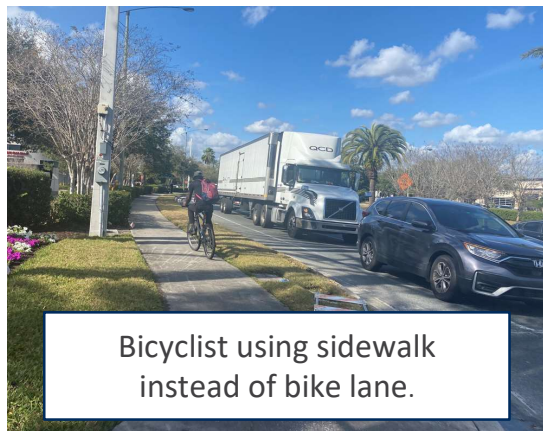
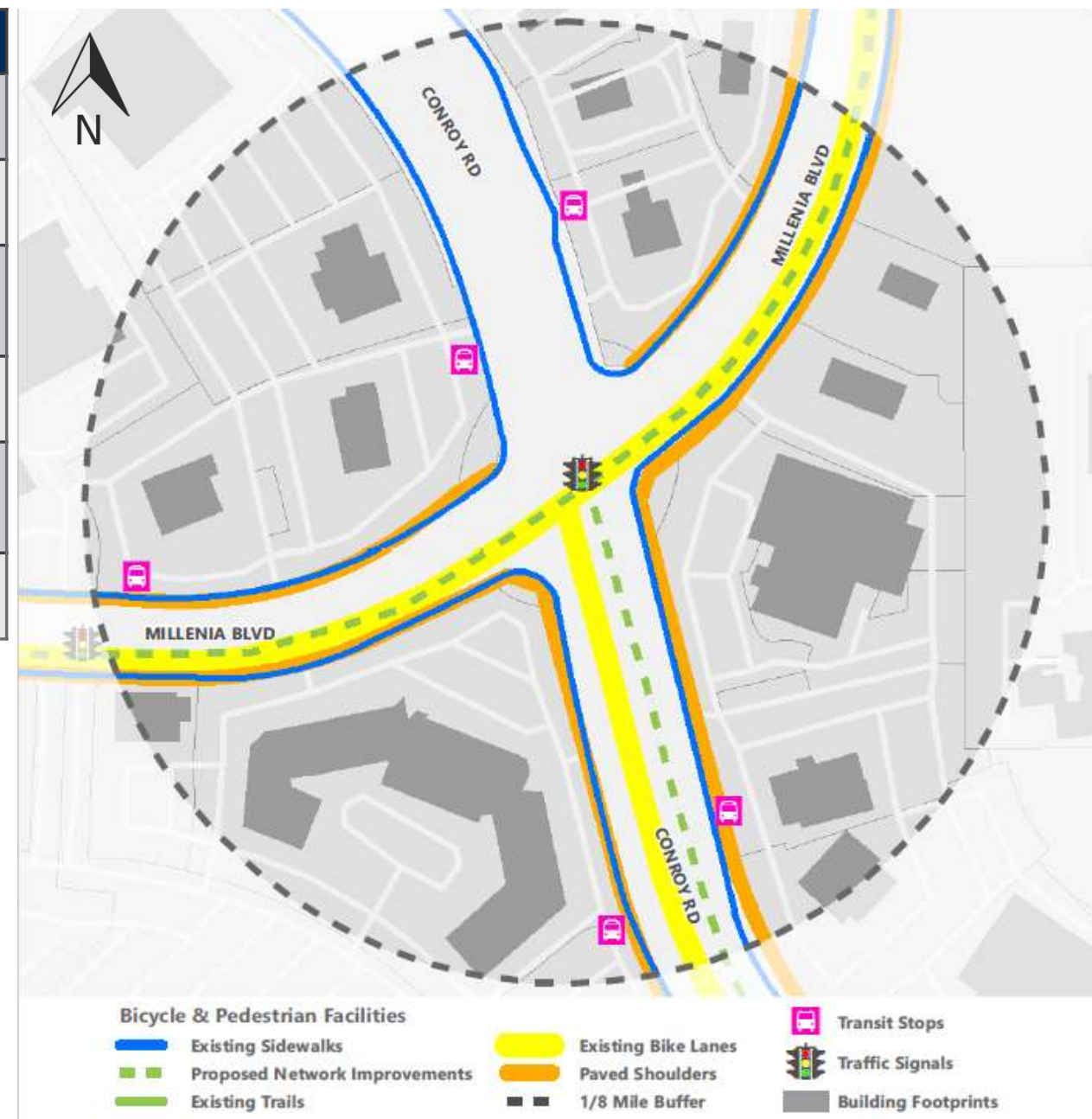
#### Short Term

- Adding turning restrictions, “Yield to Peds” signage, or “Stop for Peds” signage at the intersection.
- Adding leading pedestrian intervals at the signalized intersection.
- Audit of signage of the area to update existing or faded signage, remove unnecessary signage, and correct existing signage that is improperly labeled.

#### Long Term

- Improve sidewalk connection to the Mall at Millenia from the southbound LYNX stop on Conroy Road and widen all sidewalks in the area to improve pedestrian comfort.
- Consider installing midblock crossings connecting the two LYNX bus stop pairs along Conroy Road
- Consider moving the southbound LYNX bus stop on Conroy Road north of the intersection to a location either further north and out of the turn lane, or combining it with the westbound bus stop on Millenia Boulevard west of the intersection.
- Consider adding a bike lane and narrowing lanes on Conroy Road when resurfacing to promote slower speeds, the use of alternate transportation, and improve the safety and comfort of bicyclists and pedestrians in the area.

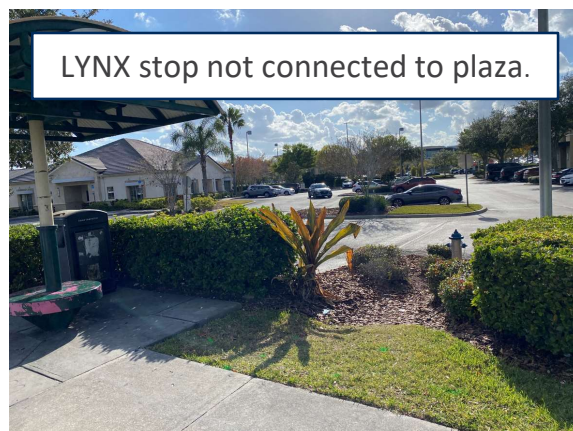
Location Metrics		
	Walk Score (walkscore.com)	<b>49 Car Dependent</b> Most errands require a car
	Bicycle Comfort (walkscore.com)	<b>69 Bikeable</b> Some bike infrastructure
	Overall Connectivity (walkscore.com)	<b>29 Some Transit</b> A few nearby public transportation options
	Residential Units	Single Family – 564 Multi Family – 1,156
	Employment	Industrial – 401 Office – 4,660 Retail – 2,925
	Key Destinations	Shopping outlets, Restaurants



Bicyclist using sidewalk instead of bike lane.



Shade trees removed.

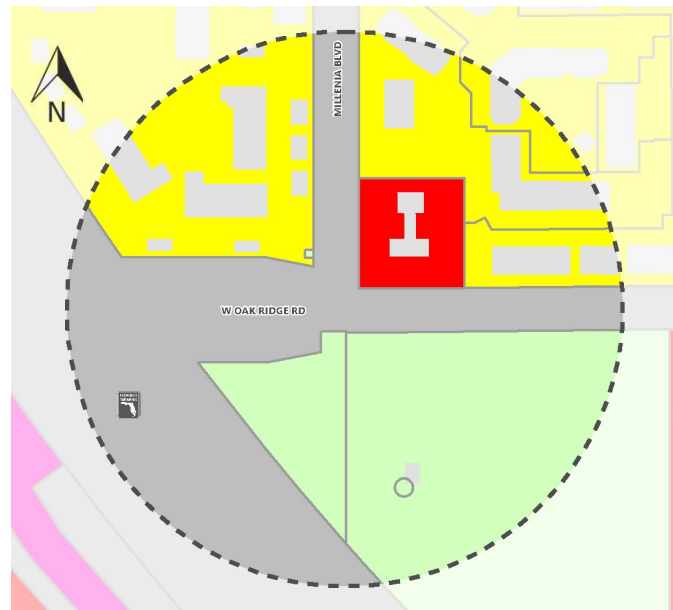


LYNX stop not connected to plaza.

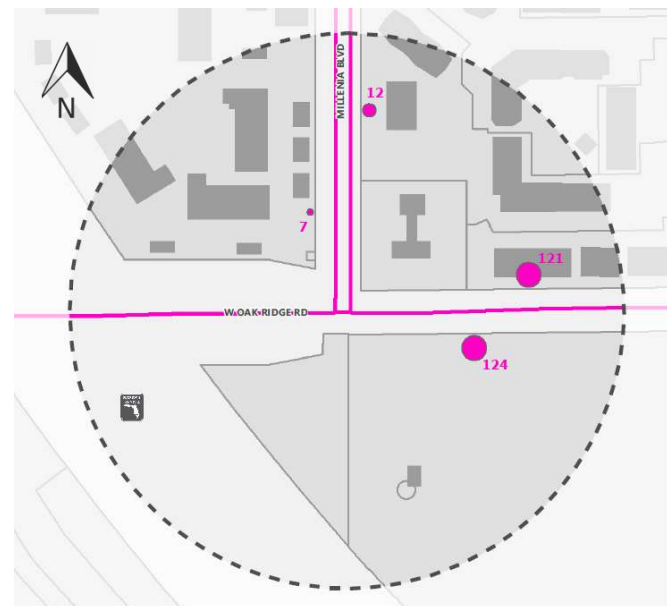


# 5

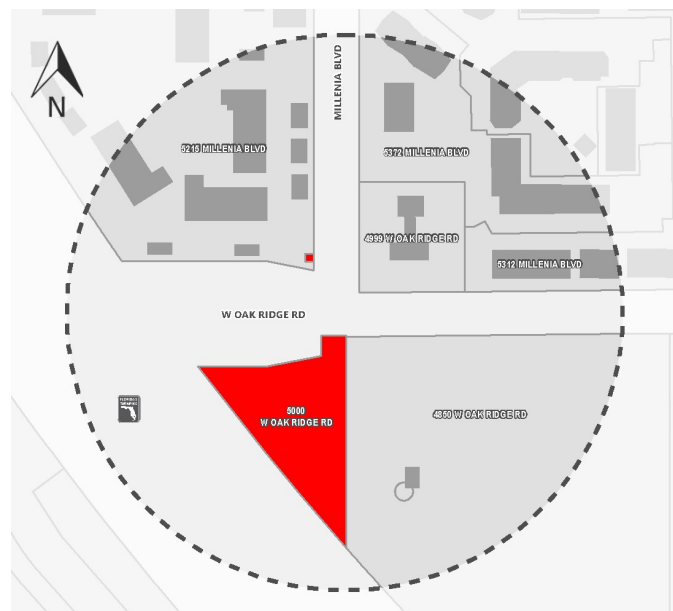
## OAK RIDGE RD @ MILLENIA BLVD



Land Use & Zoning



Transit Ridership



Parcels & Buildings



Bike & Pedestrian Facilities

This stop area features mainly residential land use to the north and recreational/public land use to the south. There is a 10-foot-wide multi-use trail on the western side of Millenia Boulevard and five-foot-wide sidewalks line the eastern side of Millenia Boulevard and both the north and south sides of Oak Ridge Road. There are one-way bike lanes on both sides of Millenia Boulevard and a north/south pedestrian crossing on Oak Ridge Road at the easternmost stop in the study area. There is one triangular parcel of vacant land that is zoned commercial that may impact travel trends in the future if developed.

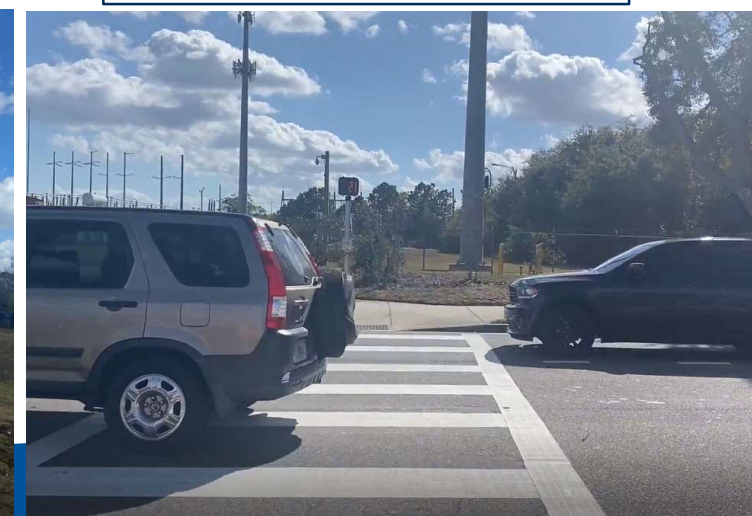
There are four LYNX bus stops in this area, two on Millenia Boulevard and two on Oak Ridge Road to the east of the intersection. These two stops on Oak Ridge Road have nearly equal average daily ridership and are the most used in the study area.

Important aspects to note:

- There are no bike lanes on Oak Ridge Road, but the southbound bike lane on Millenia Boulevard terminates without any signage.
- Signage along the trail on Millenia Boulevard is faded.
- There are several opportunities to improve bike and pedestrian safety and comfort along both Oak Ridge Road and Millenia Boulevard

Faded and outdated bike trail sign.

Left turning vehicles not yielding for pedestrians in crosswalk.



# 5

## OAK RIDGE RD @ MILLENIA BLVD







### Recommended Improvements:

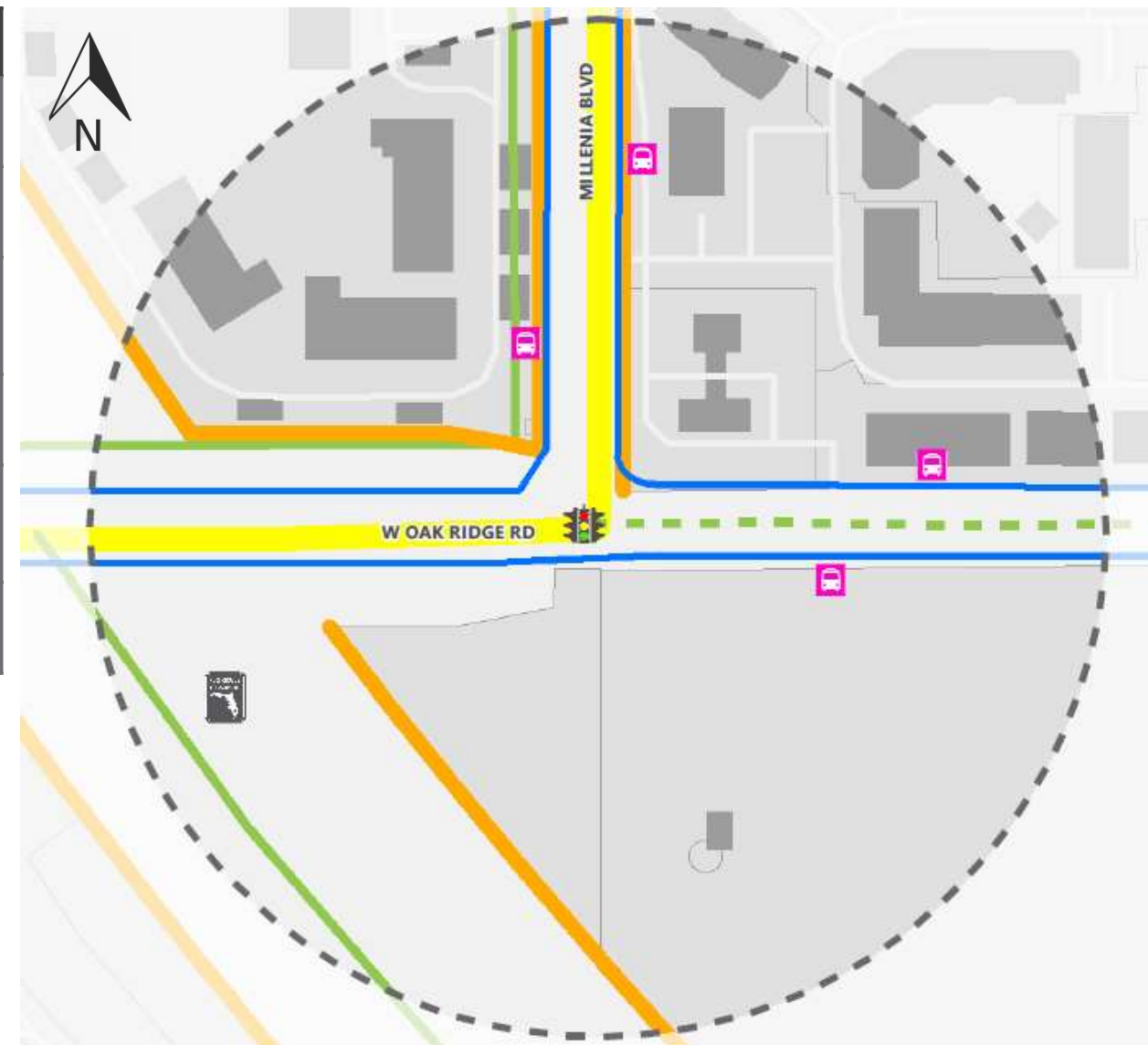
#### Short Term

- Add seating to LYNX stops along Millenia Boulevard.
- Update existing bike and pedestrian signage in the area such as the faded bike network sign on the northwest corner of the intersection.
- Address current roadway hazards such as the pothole in the trail at the northwest corner of the intersection.
- Consider the addition of an RRFB at the midblock crossing on Oak Ridge Road.

#### Long Term

- Evaluate traffic speed in the area and consider lowering speed limit to 35 mph.
- Consider narrowing the inside travel lanes up to 1.5 feet and widening both the median and pedestrian refuge along Oakridge Road to allow for improved crossing safety and slower speeds on the roadway.
- Increase spacing between the crosswalk and the stop bar on Oak Ridge Road at the intersection with Millenia Boulevard to discourage cars from stopping in the crosswalk.
- Consider shifting the eastbound LYNX stop on Oak Ridge Road further east to be better paired with the existing striped crosswalk and refuge island.

Location Metrics		
	Walk Score (walkscore.com)	<b>47 Car Dependent</b> Most errands require a car
	Bicycle Comfort (walkscore.com)	<b>71 Very Bikeable</b> Biking is convenient for most trips
	Overall Connectivity (walkscore.com)	<b>41 Some Transit</b> A few nearby public transportation options
	Residential Units	Single Family – 1,007 Multi Family – 1,013
	Employment	Industrial – 8 Office – 331 Retail - 233
	Key Destinations	Residential apartments, 7-Eleven



**Bicycle & Pedestrian Facilities**

-  Existing Sidewalks
-  Proposed Network Improvements
-  Existing Trails
-  Existing Bike Lanes
-  Paved Shoulders
-  1/8 Mile Buffer
-  Transit Stops
-  Traffic Signals
-  Building Footprints



Bus stop not connected to sidewalk.

Narrow pedestrian refuge.

Faded midblock crossing.





CITY OF  
**ORLANDO**

**SOUTHWEST BIKE AND PEDESTRIAN STUDY**